Rock Products

THE INDUSTRY'S RECOGNIZED AUTHORITY

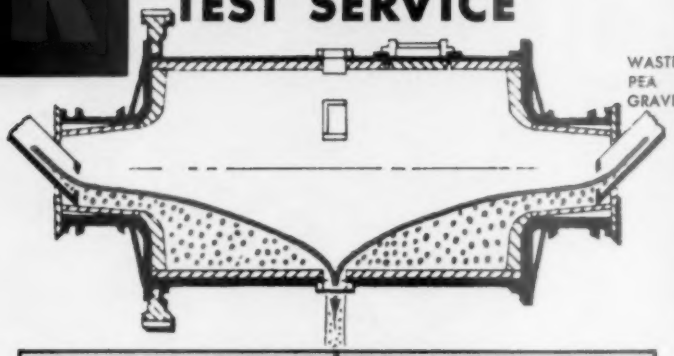
AUGUST • 1959

How to select the proper screening surface page 90

What to do about bad debt losses page 72

DENVER

SAND GRINDING TEST SERVICE



Before you invest in a grinding mill or auxiliary equipment to manufacture sand, BE SURE!

The first step to Profitable Specification Sand Production is an actual demonstration.

DENVER's completely equipped testing laboratory is backed by techniques and knowledge gained in more than 30 years of practical test and field experience. Actual demonstrations will show you:

- **Type and size of grinding mill needed to produce desired tonnage**
- **Power required**
- **Proper size auxiliary equipment, such as classifier, pumps, etc.**

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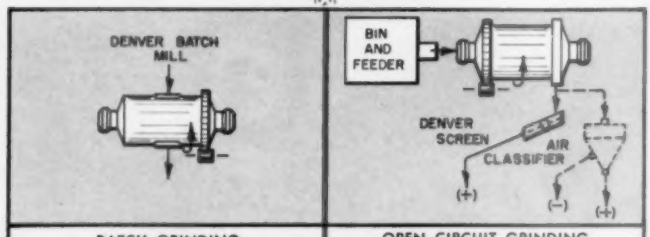
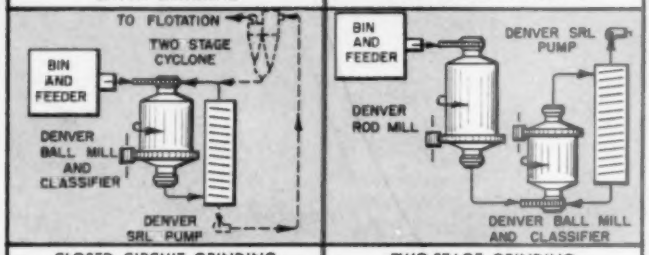
NO OBLIGATION!

Mill sizes (up to 10′ dia. by 20′ long) and type best suited for your grinding needs are described in Bulletin No. B2-B20.



BATCH GRINDING | OPEN CIRCUIT GRINDING



CLOSED CIRCUIT GRINDING | TWO-STAGE GRINDING

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Problem: Those machines bore deep holes in solid rock with power from compressed air. Dynamite put in the holes will blow the rock to bits. It used to be that the rubber air hose on these machines would go to pieces, too. When heat from the compressor got into the hose, it would harden the rubber, breaking it into loose pieces that clogged the machine, put it out of action.

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B.F.Goodrich *industrial rubber products*

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Rock Products

Vol. 62, No. 8

AUGUST 1959

FEATURES

What to do about bad debt losses ● *J. N. Bell* 72
Eight commandments of good credit procedure turned up repeatedly in a survey of credit practices in the rock industries

Media-treated gravel wins new markets ● *K. A. Godfrey, Jr.* 76
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J-M forges ahead in silica 80
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Experience builds a cement plant ● *W. B. Lenhart* 82
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ROCK PRODUCTS is published monthly by MACLEAN-HUNTER Publishing Corporation, 79 W. Monroe St., Chicago 3, Illinois: P. D. Allen, President; Copyright, 1959, by Maclean-Hunter Publishing Corporation. Second-class postage paid at Chicago, Ill. and at Long Prairie, Minn.

SUBSCRIPTION INFORMATION
Subscription Price: United States and Possessions, Canada one year, $3.00; two years, $4.00; three years, $5.00. U.S. single copies, fifty cents. Pan American, one year, $8.00; two years, $14.00; three years, $20.00. All other foreign one year, $12.00; two years, $22.00; three years, $30.00. One dollar for single copies. Canadian subscriptions and remittance may be sent in Canadian funds to ROCK PRODUCTS P.O. Box 100, Terminal "A," Toronto, Canada.

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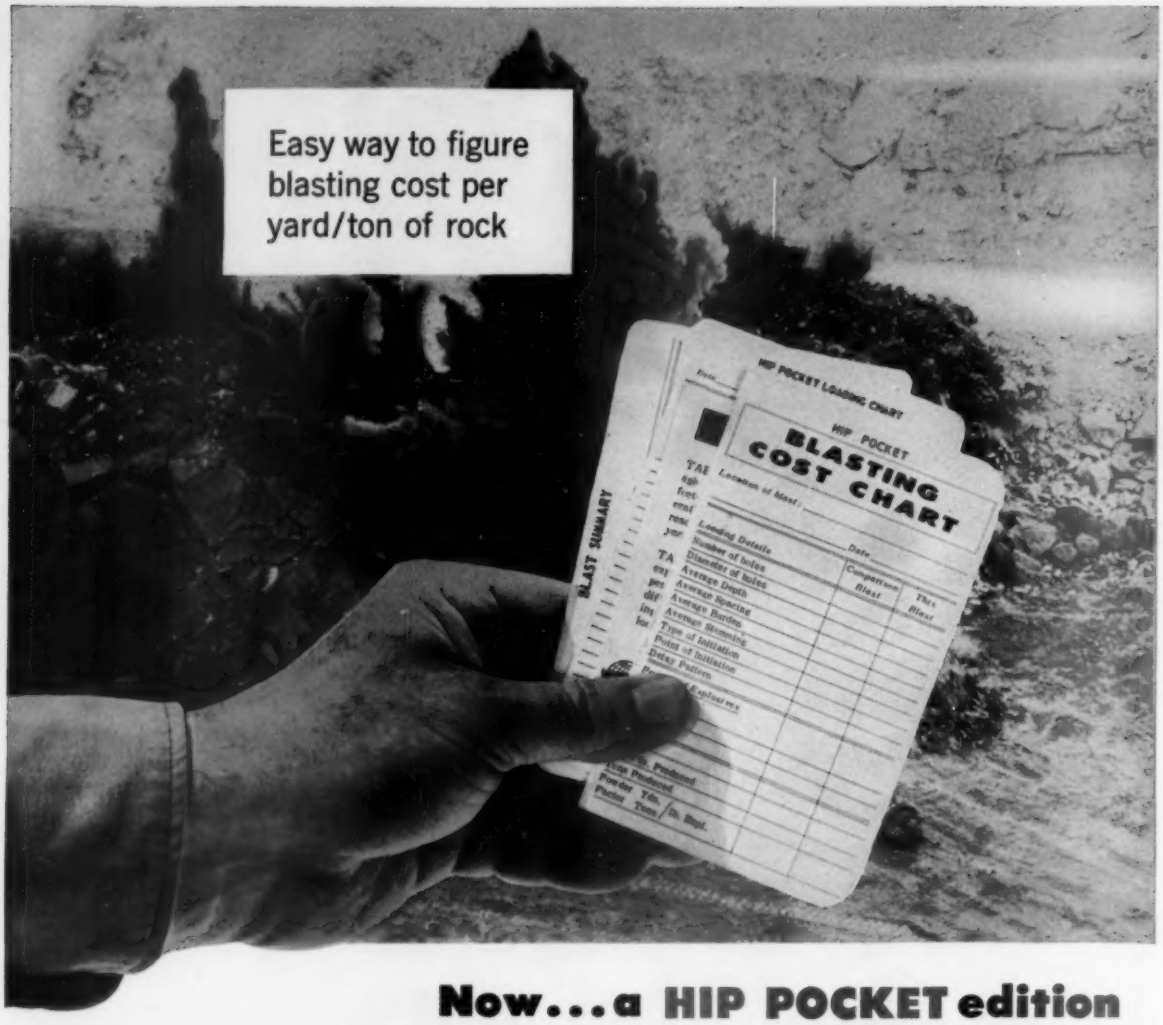
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Your shovel is your aggregate producing "factory." Production depends on that steady output that a *real* Rock Shovel can give you. Here is another of the many Model 41 Shovels in Colorado. This one is in the pits of the Whitewater Sand & Gravel Co., Grand Junction, Colorado.

All Northwest Shovels are Rock Shovels and the Model 41 is no exception. The Model 41 is a full 1 yd. Rock Shovel—not "built up," not modified from another capacity, but built from the ground up as a full 1 yd. rig capable of the output and performance you expect from a 1 yd. Shovel.

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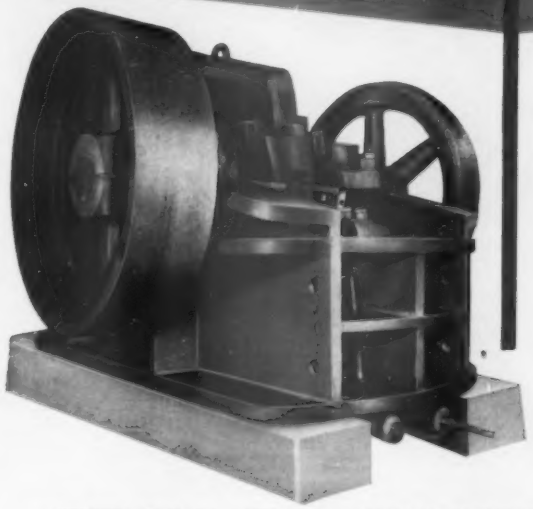
Traylor-made Type HB Jaw Crushers

offer efficiency and economy

Shown above is a Traylor-made 48" x 60" Type HB Jaw Crusher in a stone crushing plant.

A Traylor-made 36" x 42" Type HB Jaw Crusher in a cement plant.



Many operators throughout the world experience daily the economy and rugged dependability of Traylor-made HB Jaw Crushers. Jaw plates are the famous curved type—the pitman shaft is made of annealed open hearth forged steel, light but of great strength. The swing jaw is made of cast steel of extra-heavy box section design to secure maximum strength. These are a few features of the Traylor HB Jaw Crusher. For additional information, write for bulletin No. 5105 today!

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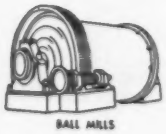
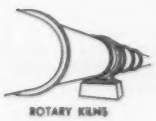


BALL MILLS



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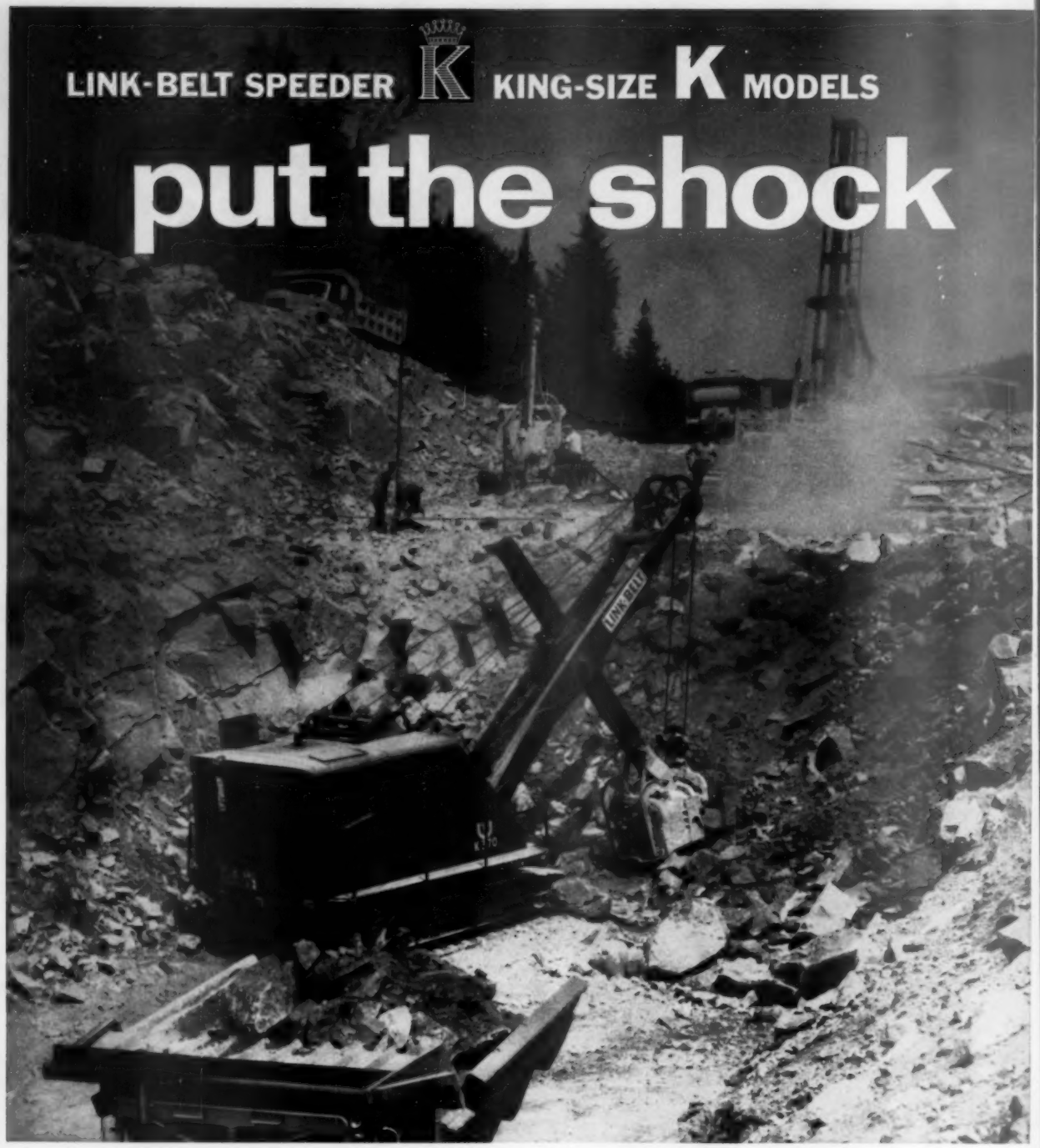
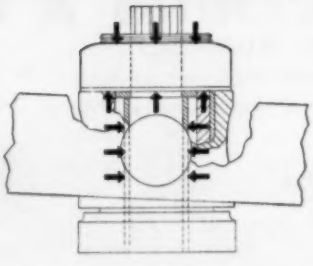
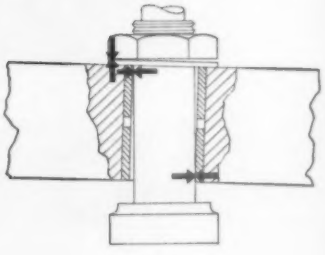
put the shock



THIS—Link-Belt Speeder rotating base is trunnioned to the centerpin. Despite tilting action of the upper, there's perfect alignment of the centerpin and the bushing, plus full-length distribution of loadings to minimize stress and wear on centerpin.



NOT THIS—Without exclusive centerpin trunnion, tilting action of the base causes concentrated bending forces on the centerpin and prying action on the centerpin nut. Result is gouged centerpin bushing when swinging . . . repeated repairs.



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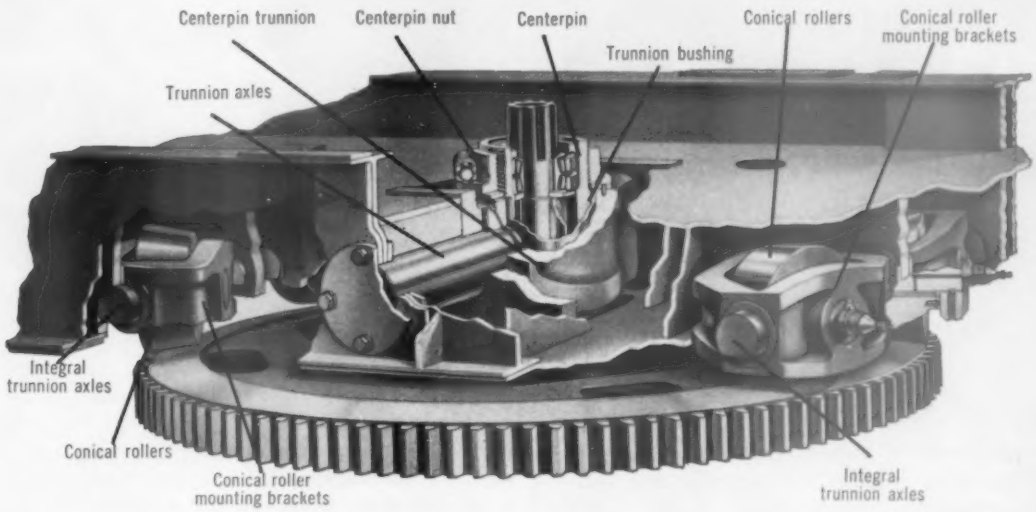
And K-models deliver these output-boosting advantages: Speed-o-Matic, the *true* power hydraulic controls . . . fast, effortless power hydraulic steer . . . *plus* bonus usable hp.

If you'd like more facts demonstrating how King-size K-models (1½ to 3-yd. capacity) outstrip the field, see your distributor or write Link-Belt Speeder Corporation, Cedar Rapids, Iowa.



Exclusive centerpin trunnion and oscillating roller design evenly distributes all loadings

The centerpin trunnion is mounted on two stub axles within the upper frame, permitting the upper to oscillate without any of the binding stresses common to other centerpin arrangements. All loadings are thus equalized with no prying action against the centerpin nut or bending stresses against centerpin and its bushing. Working hand in hand with centerpin design principle are the oscillating conical rollers. They are mounted within brackets that oscillate on stub axles, permitting full face contact of rollers with roller path at all times . . . no peening of roller edges or gouging of roller path.

15,231

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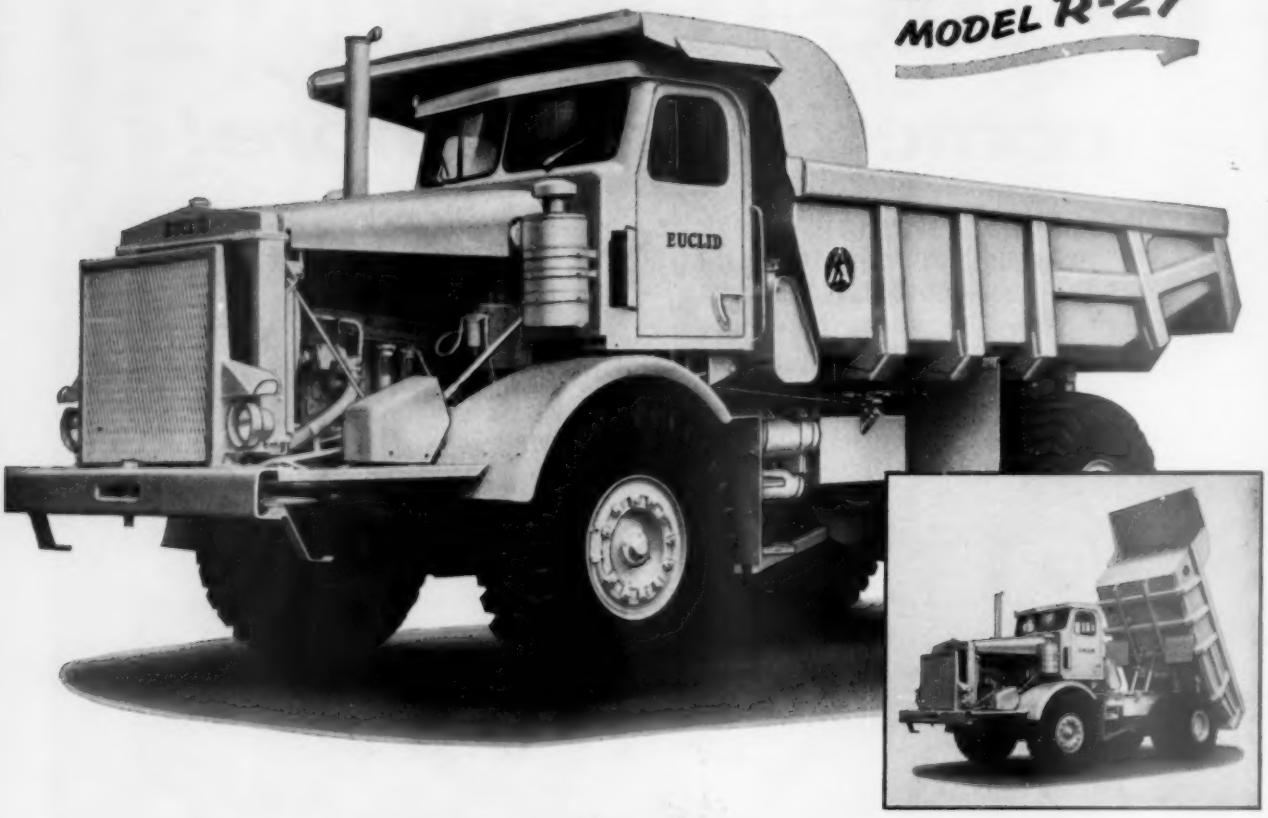
27 ton "EUC"

MODEL R-27



Torqmatic Drive . . . 18.00 x 25 tires

Model R-27 is a new size in the complete line of Euclid Rear-Dumps—rated payload is 54,000 lbs. This off-highway hauler incorporates the job-proved components which have made Euclid Rear-Dumps the outstanding choice of contractors, mines and quarries.

With either 335 h.p. Cummins or 336 h.p. GM diesel engine, the Allison Torqmatic Drive makes maximum use of the power for faster hauling cycles. Converter lock-up in the 4-speed Torqmatic permits 34 mph speed with full payload and efficient performance on long, high speed hauls.

Standard 18.00 x 25 tires on all four wheels assure the traction and load carrying capacity needed for moving 27-ton payloads on tough hauls. Standard body is rated at 18 cu. yds. struck —quarry type body is also available. The R-27 is equipped with oil retarder for safer, more economical braking on jobs with steep downgrades on the loaded haul.

See your Euclid dealer for detailed specifications on this new 27-ton Rear-Dump . . . it's a good example of the advanced design that makes Euclid your best equipment investment.

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It's new...but JOB PROVED!

Big 18.00 x 25 tires on all wheels permit better distribution of payload. Rugged body and frame are designed to withstand loading, hauling and dumping big loads of heavy excavation year in and year out. Quarry body is available for rock work.

Low loading height and good maneuverability of the R-27 increase the efficiency of loading equipment. Exhaust heated body for work with wet, sticky material is optional. Front and rear springs are thrust-mounted and free floating, with variable spring centers.

The R-27 is equipped with dual steering jacks—one for each wheel—and an independent hydraulic system for steering. Oil retarder—an integral part of the Torqmatic Drive—permits faster safe travel speeds down grade and reduce brake maintenance cost.

Large capacity hydraulic pump and twin hoists have ample power to raise and dump the load fast. Mounting brackets for the two stage double acting hoists are an integral part of frame assembly. Comfortable, well insulated cab is offset for maximum visibility.

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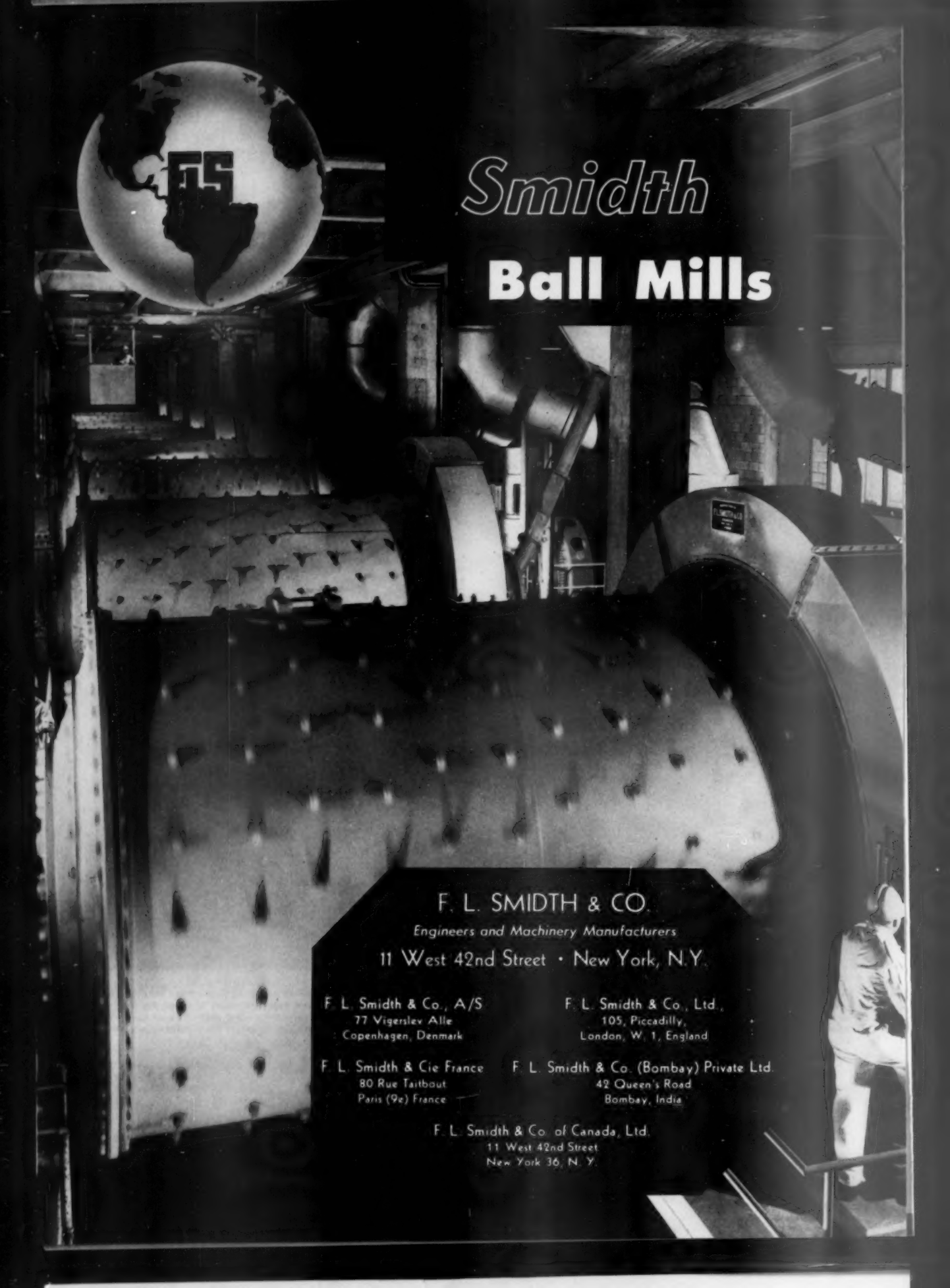
10, 15, 18, 22, 27, 40 and 50 ton capacities, also semi-trailer models of 12, 22 and 35 ton payload—to fit any job



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What's Happening

IN OTHER FIELDS OF INTEREST TO THE ROCK PRODUCTS INDUSTRY

August, 1959

Ceramic sponges for radioactive wastes have been tested at the Los Alamos laboratories of the University of California. The sponges are bricks of calcined clays, diatomaceous earths and foaming agents fired to about 1,450 deg. F. When immersed in radioactive liquid wastes, the bricks can adsorb up to double their own weight after three or four heating cycles. To dispose of the bricks they are first fused at about 2,400 deg. F. to seal them. This prevents leaching of the lethal contents. While the bricks can then be readily disposed of, they are in a form which may prove to have some commercial value as a source of radioactivity.

More than 800 electron tubes are used in the control system of a new 335,000-kw. turbine generator at Consolidated Edison's Astoria, N.Y., station. These vacuum tubes detect heat, vibration and dimension changes in critical but inaccessible parts of what is believed to be the world's largest generator. Very minute changes are sensed and are amplified by the electronic system. Recording or warning instruments enable the human operators to keep very close watch on the functioning of the giant machine.

Ice has become an almost commonplace construction material. An Alberta, Canada, rock products producer reports that it made an ice bridge over a local river to support haulage trucks. Refrigerant was pumped through a network of plastic pipe in the bottom of the river, building up a 3-ft. thick, 30-ft. wide and 150-ft. long block of ice. This roadway supported the firm's trucks hauling fill for a construction job.

No more lost rail cars is the aim of Link Aviation, Inc. This maker of navigation aids offers an electronic device for "tagging" every box car and gondola so that it will signal its identification to control towers in railroad marshalling yards and check points. If the system is widely adopted by railroads, it can sharply reduce the cost of identifying and checking the movement of individual roadroad cars, now a major operating expense.

Space suits and oxygen tanks will be standard equipment for workers in a new metal processing plant now under construction at Bridgeville, Pa. Furnace, rolling mill and forge will be placed in an air-tight room filled with inert argon gas under pressure, so that specially designed suits will be needed for the operators. The new plant will convert billets of tungsten, molybdenum, niobium and tantalum into structural shapes and sheets. This is a feat quite impossible in a normal atmosphere since these refractory metals become highly reactive at rolling and forging temperatures.

WHAT'S HAPPENING

Microscopic amounts of toxic fluorine compounds in the air near Florida's phosphate chemical producers are believed to be the cause of several plant and animal diseases in the area. A half-million dollar damage suit has been filed against seven producers in the region as the result of citrus and cattle poisoning by fumes from superphosphate operations. The producers have developed a joint air pollution research program to determine the cause and extent of any damage which may result from fumes discharged from their processing plants.

Strange things are happening to metals these days. General Electric Co. has succeeded in foaming nickel, copper and cast iron; moreover, the process makes it possible to foam other metals. Fine metallic powders are mixed with foaming agents which release either nitrogen or carbon dioxide during a baking operation. Density of the finished foam depends upon the relative proportions of the metals and the foaming agents, while the shape of the finished foam can be controlled during baking. National Research Corp. has developed a new technique for making ultra-fine metal powders of aluminum, nickel, and iron. These metal powders are about one-millionth of an inch in diameter—about one thousandth the diameter of powders made by conventional methods.

Electricity directly from nuclear energy has been produced by the Atomic Energy Commission's Los Alamos laboratory. An enriched uranium rod in a cesium vapor-filled tube generated a kilowatt of electricity while it was held in the core of a reactor. While no immediate commercial application is planned, this thermoneuclear technique may eventually greatly reduce the construction cost of reactors by eliminating steam generating equipment.

Driving piles is easy—the way the Russians claim they do it. A technique of vibrating structural piling until it sinks into the ground was revealed by Soviet engineers at a recent civil engineering seminar. This method apparently takes about a fifth as much time as conventional pile driving. When it is necessary to pull the piling, the Russians use much the same methods. By attaching a heavy vibrator to the pulling cable, a crane can literally slip the piling out of the ground.

Hot boxes on freight trains will now be detected by an infra-red heat sensing device to be widely installed on the Pennsylvania Railroad. The excess heat generated by defective wheel bearings is detected by the instrument. An electrical relay system sets the next block signal to halt the freight train at a convenient siding where the defective car can be cut out of the train. The new device is the result of a three-year program to solve one of the railroad's major causes of delay and operating expense.

Fly ash can be used as an aggregate for both portland cement and lime, according to a report in the Polish journal, Materialy Budowlane. Best results were obtained after heating the fly ash to about 900 deg. C., and using about 20 percent by weight of hydrated lime. This produced a test specimen with about 1,500 psi. compressive strength.

The editors

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EDITOR'S PAGE

George C. Lindsay, Editor

Who's in charge of maintenance?

SUCCESS OF YOUR MAINTENANCE PROGRAM usually goes as your maintenance chief goes. Is he the dynamic individual that he has to be to handle this complex problem? Is he an expert on handling men and methods? Just as important, does he have top management's support in implementing the right kind of a cost-saving productivity-raising program?

You know the answers to these questions. You know whether they're the right answers. And if they're not, future action should be clear to you.

Equipment maintenance is a management function. It directly—and sometimes seriously—affects equipment and employe productivity as well as material costs. But the plain and sorrowful fact is that it is ignored too often in industry. An operation so important to good performance and good costs must not be allowed to function blindly, as it sometimes does. Conversely, management can't afford to have any but the best maintenance program. A haphazard system means loss of dollars from profits; in some cases, it means the difference between profit and loss.

We've stated before (RP, June 1959, pg. 15) that your maintenance man of the future will be real important to you. That he will be; but don't forget that he's valuable to you now.

Take a look at the top maintenance man's responsibilities. They present a real challenge. He must program activities of employe training and service, plus a good maintenance program itself. He must doggedly push for program changes that will better his program—and costs. Maybe he will have to battle for these changes when they're least popular. But he still has to get along with all other departments and top management. Specifically, he has a tough job of selling production operators on proper care and treatment of equipment. This is too often overlooked.

These are just some of his problems. Yet, he can't be effective in his job unless management gives him the best working tools. The clerical setup must suffice. Degree of complexity depends upon size of operation and other special needs. The maintenance man and his department should have the respect they're entitled to—from management and other departments—if he is to do his best job.

Ideas here are from an article that will appear in next month's issue. We urge you to look for it—and to take a good look at your maintenance program and personnel.

You have a chance to save dollars and raise profits. Who's in charge of your company's maintenance?

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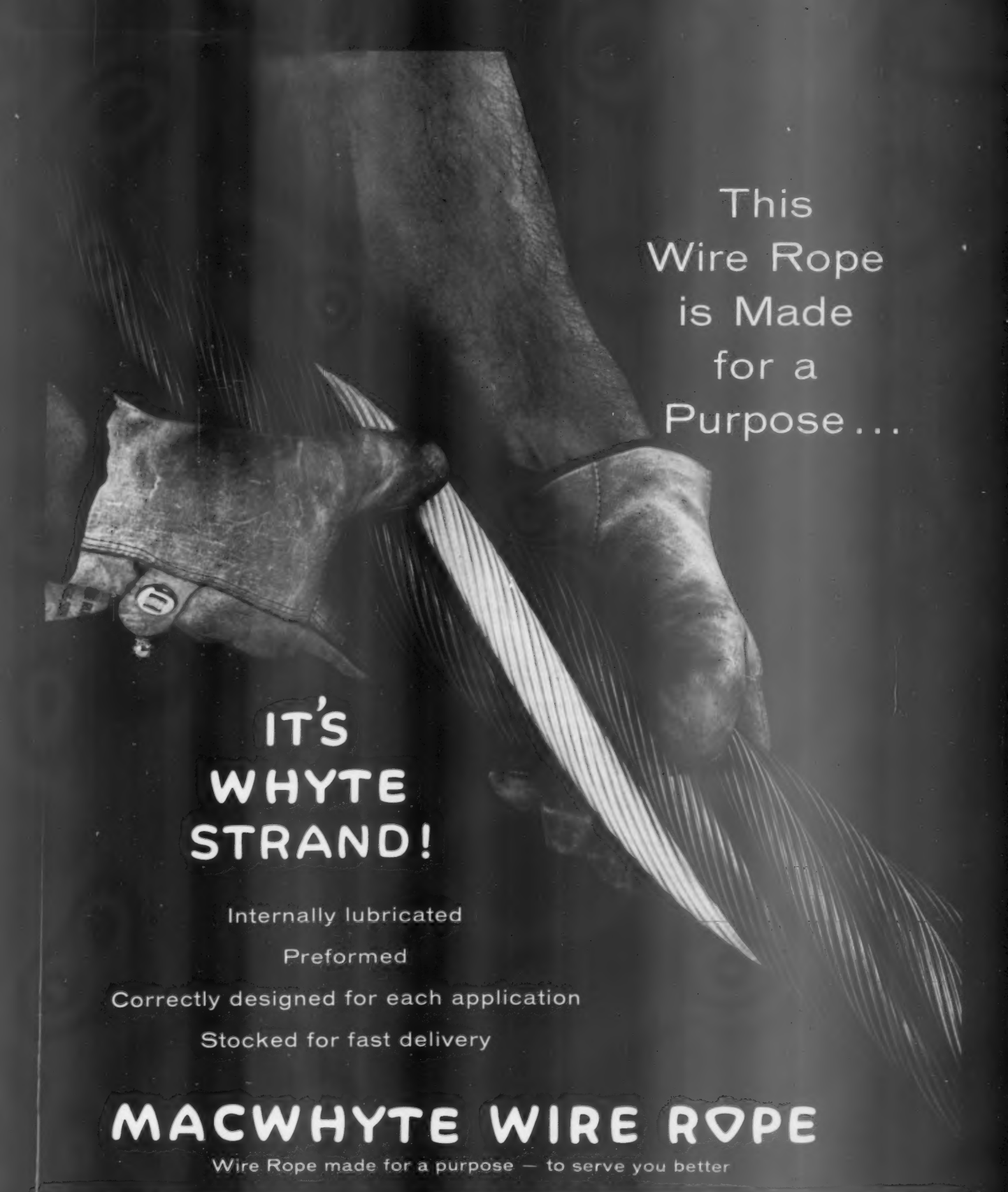

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ROCKY'S NOTES

NATHAN C. ROCKWOOD

More details of Japanese cement research

WE PROMISED IN THE BRIEF REVIEW of the proceedings of the Eleventh General Meeting of the Japan Cement Engineering Association (1957) in the April, 1959, issue, to return to this subject in a subsequent issue. Our first article aroused considerable interest, and several readers expressed a desire to have copies of this book of 94 pp.* Those who succeeded in obtaining a copy have found much interesting and suggestive material, some of which we shall attempt to summarize here. In our previous comments we noted the difference in approach to the problems of cement and concrete research between the Japanese cement industry and our own cement industry as represented by the Portland Cement Association research activities.

We are told that our April "Notes" conveyed an entirely erroneous idea if it suggested that there is anything secretive about the PCA approach to research. There is obviously a difference in the handling of research problems, as well as a difference in the type of research undertaken in each instance. As noted in our April discussion, Japanese cement and concrete research is conducted in cooperation with member company laboratories, universities and public works laboratories, and the results are disclosed and discussed in open meetings attended by all interested. We learn from an item in **ASTM Bulletin** for May that the PCA has announced publication of the **Journal of the Research and Development Laboratories** which will render obsolete some of the strictures referred to in our April Notes. Dr. A. Allan Bates, vice president for research and development of PCA, is quoted: "We shall feel at liberty in this **Journal** to indulge in scientific speculation and controversy and to permit our friends and co-workers from other institutions of research and learning to do so. For this is the way of progress in the natural sciences."

*Published by the Japan Cement Engineering Association, No. 1 Akasaka-Daimachi Minatoku, Tokyo, Japan, in 1959

Japanese cement and concrete research appears to be directed more particularly toward the solution of practical problems. Much of the PCA research is in basic physical and chemical problems which underlie all the other problems. There are, thus, two ways to study basic research problems. The one the Japanese appear to accept is to acquire basic facts piecemeal and, ultimately, in all probability to put them together in such a way that the underlying basic facts or principles of physical, structural and colloid chemistry will become apparent. The method adopted by the PCA appears to be to establish, first, the basic facts or principles of the physical and structural chemistry of cement and concrete and, subsequently, to relate the vast store of recorded data to such basic research. The Japanese method seems to us possibly the best approach for laymen with limited knowledge of physical and structural chemistry, for they can learn as they progress. The PCA method develops basic data of great value and interest to all other researchers in the fields of physical and structural chemistry, but mostly too erudite for absorption and digest by the layman who is most anxious to apply the new knowledge.

Dusting: As an example of Japanese research, three members of the faculty of engineering, University of Tokyo, studied pure β C_2S (the desirable form of dicalcium silicate). They arrived at an explanation for the dusting of dicalcium silicate in cement clinker, a problem that has baffled cement chemists for a long time. Their conclusion is stated as follows: "When α C_2S is quenched, it does not stay long in the stable range of α'; therefore α' is not perfectly crystallized. Thus it changes to β C_2S. But when β C_2S is reheated up to nearly 1,400 deg. C., gradually α' C_2S is perfectly crystallized. Perfectly crystallized α' cannot change to β at transition point, and below this point it dusts to γ C_2S. Therefore, dusting is the phenomenon that occurs when perfectly crystallized α' suddenly changes to γ in powder form." The most recent textbooks merely speculate on the cause of dusting.

By-Product Gypsum: Powdered calcium sulfate

Please turn to page 141

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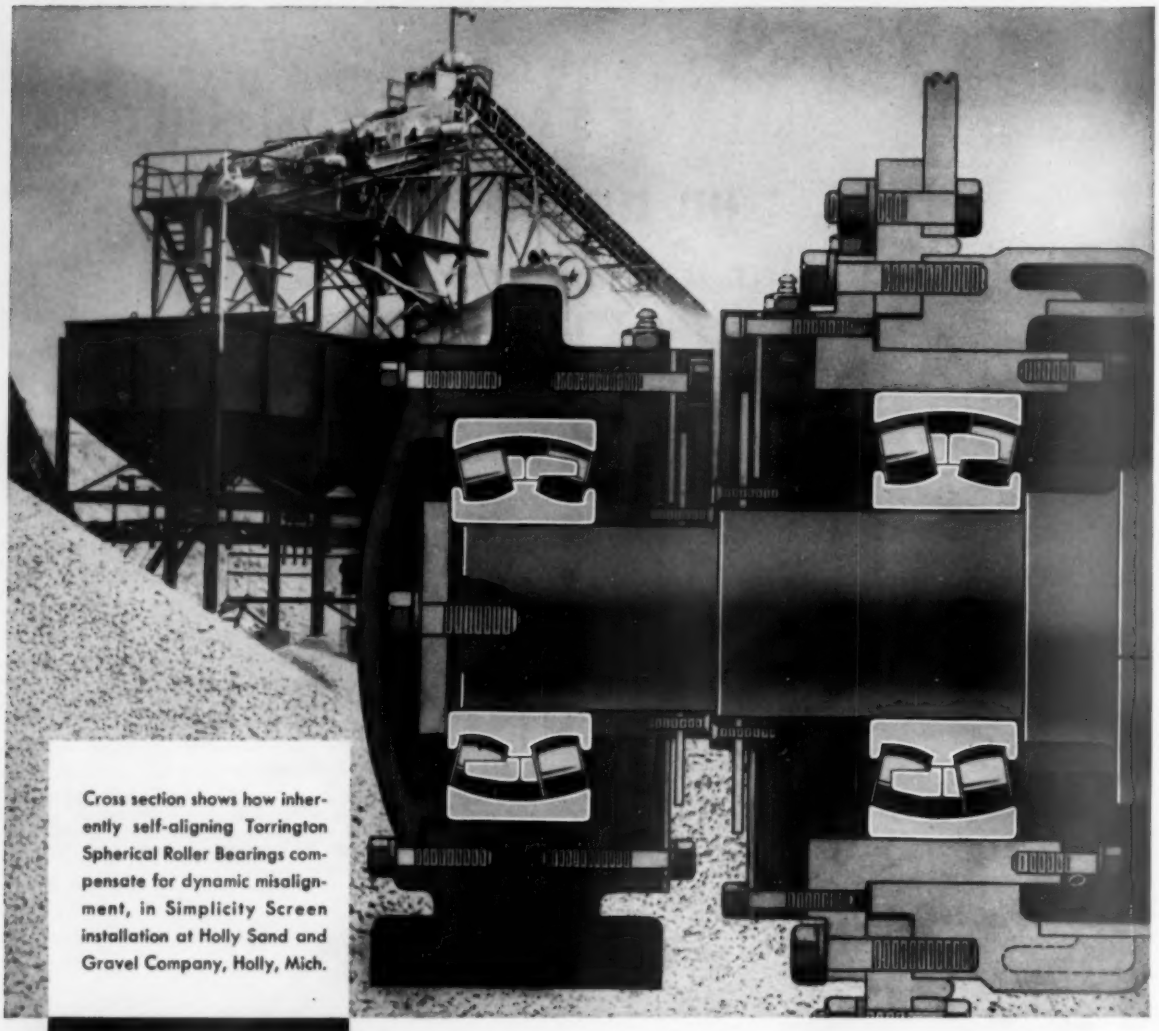

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Washington Letter

Edgar Poe

Heat-Resistant Concretes

The space and missile age is resulting in the National Bureau of Standards seeking to aid missile and aircraft engineers in finding new and improved heat-resistant materials. As a result, the Bureau has been investigating for some time the preparation and properties of heat-resistant concretes, commonly described as refractory castables.

These castables are prepared from a mixture of aluminous cements and heat-resistant aggregates. When combined with water, the mixture can be cast like concrete. After curing, the cast is suitable for use over a wide range of temperatures. The bureau says an application was the construction of missile launch pads for Cape Canaveral, Florida.

Surplus Equipment

The Pentagon is eager to sell or dump $60,000,000,000 of surplus equipment. Most of it is old and obsolete. Perhaps most of it should not have been bought in the first place, but wars and defense preparations are a constant round of wasteful operations. Surplus equipment includes bulldozers, tanks, planes, ships and ammunition. Based on past performances, about $9,000,000,000 worth of military equipment bought each year will rot each year in warehouses and parking lots.

Concrete Containers

Radioactive wastes are a big headache to projects under the Atomic Energy Commission. The agency has granted a license to the Walker Trucking Company, New Britain, Conn., for disposal of low-level radioactive wastes. The trucking firm plans to use waste containers reinforced with concrete dense enough to permit sinking at least 1,000 fathoms in the Atlantic Ocean 100 miles off Long Island, N.Y.

New black Top road Material

Members of the big Pennsylvania Congressional delegation are beating the drums for a new black top road paving material. The new material, a binder with bituminous coal as its base, is a product of chemistry and the abundant bituminous Pennsylvania coal fields.

Senator Clark and other members of the delegation have placed highly favorable reports of the potential road construction material in the "Congressional Record." Curtiss-Wright Corporation is the developer of the process. The big question is yet to be answered. Will the material hold up under road tests? It is said that 2,200 tons of coal will be used in a mile of 2-lane highway.

The Federal Bureau of Public Roads will be watching with interest the 12-mile sections that Pennsylvania proposes to build on well traveled highways to see if the material is as good as sponsors say the laboratory tests show.

Cement, Sand and Gravel use

Congress was advised that the impact of a construction cutback would vary widely, depending upon the degree of involvement by the individual supplier in the highway industry. The American Road Builders Association informed the law-makers that approximately 24 percent of all portland cement manufactured in the United States is used for the highway purposes. An interruption in the Interstate Program would be felt with particular severity in the growing prestressed concrete segment of the industry because some 50 percent of prestressed production is devoted to highway uses.

At least 50 percent and possibly 60 percent of sand and gravel commercially produced is used for road building. The ARBA spokesman said that 70 percent of asphalt production is used for highway purposes. It is estimated that 20 percent of net contract construction cost is accounted for by the cost of paving materials.

States are Levying Impost

The Supreme Court decision holding constitutional tax by state governments on corporations operating interstate in their states means more and more states are going to levy such taxes on the locally earned income by those companies.

More than 25 states are now in legal position to tax interstate business. They include Alabama, Arizona, Arkansas, California, Colorado, Delaware, Georgia, Idaho, Iowa, Kansas, Kentucky, Louisiana, Maryland, Minnesota, Mississippi, Missouri, New Mexico, North Carolina, North Dakota, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Utah, Virginia and Wisconsin.

Perhaps it is but a matter of time until most of the other states, some of them like Michigan, sorely pressed for funds, will impose a tax on interstate business.

State taxes Under study

The big Central Government in Washington, through Congress, has taxed and taxed so much that tax sources to local and State governments are almost dried up. Nevertheless, the Small Business Administration has under study state government taxation of out-of-state firms.

The study grew out of the U.S. Supreme Court's affirmation of a North Carolina decision holding that a state may tax an out-of-state firm for the business done within a state, even though it had no physical property within the state. Witnesses before the Small Business Administration held that the administrative expense of paying the taxes might be more burdensome than the impost itself. One consideration weighed by the committee in Washington is whether it would be helpful to have uniform guides on state taxation of out-of-state businesses. There are now wide differences in state tax levies.

Bridge Cost up

With bridge clearance requirements for new highways posing problems, Senator Francis Case introduced a bill designed to focus some attention on the rising cost of bridge building over navigable streams.

The measure by the South Dakota Republican, backed by the Eisenhower Administration, would require Federal recognition of the equal rights of all forms of transportation when bridge clearance standards are set. At present, only the needs of ships and barges must be considered. Currently, the effect of clearance policies on road builders and utility operators often is an increase in their cost in order to accommodate ship and barge lines.

Foreign Building Materials

All Public Roads field offices and the various State Highway departments have received a memorandum from Federal Highway Administrator B. D. Tallamy asserting that State highway departments may restrict use of foreign road building materials. He cited six conditions whereby foreign materials could be curbed under the 1933-enacted Buy American Act. This statute gives preference to domestic materials.

In several states little or no foreign materials are bought. Mr. Tallamy said each bidder, among other things, must indicate in his bid whether he proposes to use a foreign article or material. For the purpose of comparing bids, the total bid price on the entire contract submitted by any bidder offering a material or article of foreign origin, shall be increased by an amount equal to 6 percent of the bid price for such material or article.

The Administrator declared in the memorandum that Public Roads will not approve any plans, specifications or other contract award inconsistent with his memo.

Congress Cold to Tax hike

Despite President Eisenhower's reiterated appeals, Congress seems determined to turn down an increase in the federal gasoline tax from 3 to 4½ cents a gallon. This was indicated when the Senate rejected a proposed increase in a test vote. For the immediate years ahead, at least, Congress probably will leave any gasoline tax increase to the hard-pressed states to finance their road programs.

Meantime, more than a dozen state legislatures thus far this year have authorized the issuance of bonds to finance highway construction for either federal aid highways, state highways, federal aid and state highways, farm-to-market roads, etc.

In a ringing appeal to Congress, President Eisenhower declared: "We are on the verge of a stalemate in the orderly development of our vital interstate network. This is a critical situation. . ."

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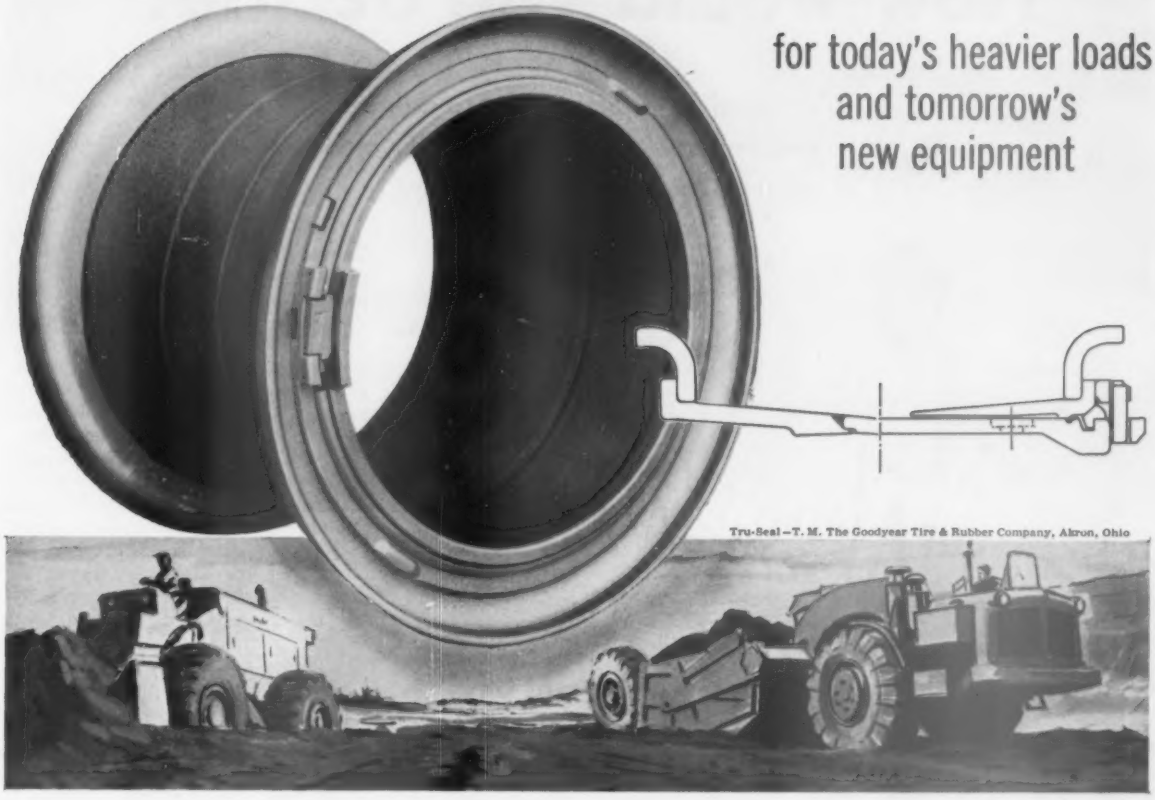

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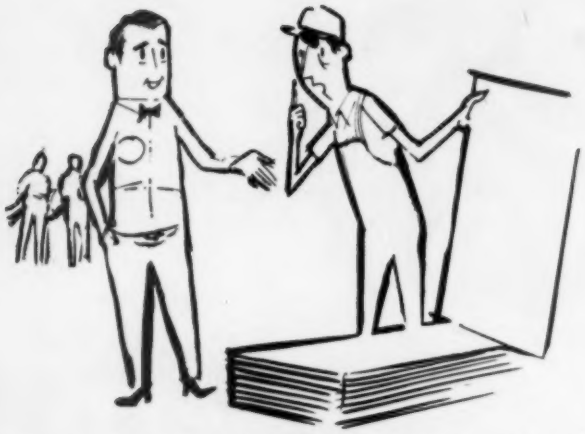
How would you decide?

A round-up of actual day-to-day in-plant problems and how they were handled by management men



Can you suspend a man who does job the hard way?

What Happened: Bill Temple was a laborer. His job was to pile thin sheets of material so that they could be hauled away for processing. When foreman Dworkes made his rounds, he noticed that Bill was piling the sheets one at a time. "Why don't you take them three at a time? It's easier," he said.

"Why three at a time?" Bill asked. "Last time I did it, I piled them one at a time."

"It's easier three at a time," the foreman replied. "The sheets stick together and if you do one at a time, you have to pull each one separately. Besides, your way takes three times as long and we need this job by 8 o'clock."

When the foreman came back two hours later, Bill was back at his old pace of one at a time. "You're not trying to make it easier," Bill said. "You're trying to speed me up."

The foreman suspended Bill for two days for insubordination. The worker grieved, claiming:

1. I did this job once before and did it one at a time and got no complaint.
2. The other way is easier, but I don't mind doing it the hard way.
3. The foreman is trying to change the performance standard.

Countered the foreman:

1. If I'm trying to change the performance standard, that's a separate grievance.
2. As foreman, it's my job to figure out how a task can best be done. If I figured out an easier way, the worker should obey and be glad of it.

Was the foreman:
Right? ☐ **Wrong?** ☐

What Arbitrator Crawford ruled: "The grievant's response was to dog the job. He lifted one sheet at a time instead of the method that he and others normally used of lifting several sheets at a time to stack. In fact, the grievant chose a harder and slower way of doing the job. At 9:30 p.m.—in spite of repeated instructions to handle several sheets at a time—the grievant was still lifting one sheet at a time. Obviously the grievant was insubordinate, and at his own expense, for he made the job more difficult for himself. The grievant's claim is denied."

Can you fire employes for gambling if you have no rule prohibiting such activity?

What Happened: Hal Doane was a good worker but his foreman had a problem with him. Doane was a human "walky-talky." He would leave his post often to chat with other employes. It developed later that his purpose was not purely social. He had a lucrative business on the side—writing "numbers." When the company caught up with his sideline, he was fired.

He took his case up through the grievance machinery on the grounds that the company had no rule against

gambling and, therefore, could not fire him for that activity.

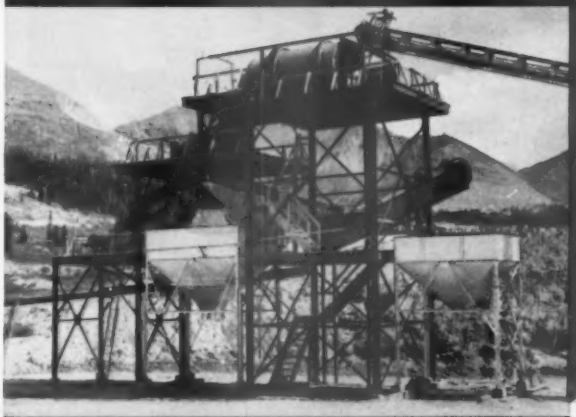
The company claimed that it didn't need any rule against this type of gambling because "numbers writing" was illegal and a criminal offense according to State law.

Was the employe:
Right? ☐ **Wrong?** ☐

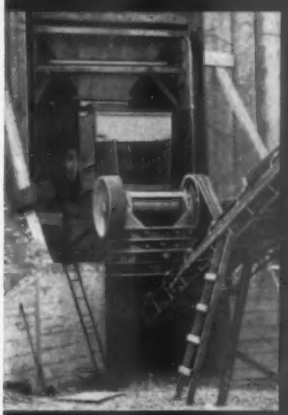
What Arbitrator Marcus ruled: "To say that the absence of a rule in the company's Rules and Regulations, specifying that an act of an employe in violation of the State Criminal Code on company time and company property would not be tolerated, would be to imply that, in the absence of such a rule, the company would condone a criminal act on its premises and thus make itself an accessory to it. Grievance denied. The employe was properly discharged." END

COLORADO Concrete Aggregate Plant

C. Ryan & Son aggregate plant near Climax, Colorado



Telsmith Super-Scrubber, Vibro-King Finishing Screen, and Sand Classifier, and Gravel Rewasher over steel bins



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Scalping Screen, and Gyrasphere Secondary Crusher

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PEOPLE

IN THE NEWS

Wolf elected at American Cement Corp.

ROBERT B. WOLF, a partner in the Philadelphia law firm of Wolf, Block, Schoor & Solis-Cohen, has been elected a director of American Cement Corp. Mr. Wolf is active in civic and business affairs in Philadelphia. He is a director of the Southeastern Pennsylvania chapter of the American Red Cross, a director of the Greater Philadelphia Movement, a trustee of the Psychiatric hospital, chairman of the Pennsylvania Citizens Committee for Constitutional Revision. Mr. Wolf graduated from Wm. Penn Charter School in 1932, Haverford College in 1936 and Harvard University Law School in 1939. During 1956-57 he was general counsel for the FHA, Washington, D.C.

Carroll joins Ruberoid

JAMES P. CARROLL has joined The Ruberoid Co., as director of public relations. He was formerly public relations director of Harris D. McKinney, Inc., Pa., an industrial advertising agency. Previously, he was associated for ten years with the New York news department of Doremus & Company.

National Gypsum lists two new plant managers

JOHN PITTS, JR., is new manager of the National City, Mich., gypsum plant and nearby Tawas City gypsum quarry and ship loading terminal of National Gypsum Co., Buffalo, N.Y. For the past four years, Mr. Pitts had been manager of the firm's Fort Dodge, Iowa, gypsum plant. He has served in mining and production management positions for 20 years.

The firm also named Dudley F. Singer manager of its Alexandria, Ind., rock wool and acoustical tile plant. Mr. Singer had been production superintendent at the plant for two years. He has almost 20 years' experience in the rock wool and acoustical tile industry.

Ideal's Turtle named chief of purchasing agents group

JACK TURTLE of Ideal Cement Co., Denver, Colo., has been elected president of the Purchasing Agents Association of Denver. He succeeds H. Robert Graybert of Eastman Oil Well Survey Co., who has been named a national director of the group.

Snyder is Buffalo's "Businessman of the Year"

HARRIS N. SNYDER, president and treasurer of the Buffalo Slag Co., Buffalo, N.Y., has been named "Businessman of the Year" by the University of Buffalo School of Business alumni association at its annual dinner.

His professional activities have included the presidency of three firms before assuming his present post; the firms are Federal Portland Cement Co., Federal Crushed Stone Corp. and Hornell Gravel Corp. The latter merged with Buffalo Slag.

Mr. Snyder is vice president of the Millard Fillmore Hospital, president of the Buffalo YMCA's board of trustees and a member of the council of the University of Buffalo.

Dunbeck elected at Foundrymen's Society

NORMAN J. DUNBECK, who heads the industrial minerals division of International Minerals & Chemical Corp., Chicago, Ill., was elected vice president of the American Foundrymen's Society at its annual convention.

Mr. Dunbeck was formerly on the Society's national board of directors. He has been also active on many of its technical committees.

In the foundry supply industry since 1926, Mr. Dunbeck was general manager of Eastern Clay Products, Inc., Jackson, Ohio, when that firm was acquired by International in 1951. As vice president of IMC's industrial minerals division, he directs 23 plants and mines in the United States, Canada and Mexico.

Ford named at Solite

A. CABELL FORD, JR., has been appointed sales representative for the new Raleigh office of Carolina Solite Corp., producers of lightweight manufactured aggregate. Mr. Ford attended Hampden-Sydney College and worked four years at the U. S. Gypsum Co.

(Continued on page 30)

In New Trucks or Old—
EATON INDUCTALLOY AXLE SHAFTS

LAST 3 to 10 TIMES LONGER

Through billions of miles of heavy-duty service, Eaton Inductalloy Axle Shafts have proved their ability to deliver superior performance. Freedom from break-down—more time on the road, less time in the shop—plus thousands of trouble-free miles added to axle life, mean lower over-all operating cost.

Eaton's exclusive method of dual hardening truck axle shafts produces an extremely hard case extending deep into the material structure, and enables Inductalloy Axle Shafts to handle more work and abuse without fatigue failure.

Eaton Inductalloy Axle Shafts are available not only in new axle equipment, but also as replacements for earlier models. Ask your truck dealer for complete information.

EATON

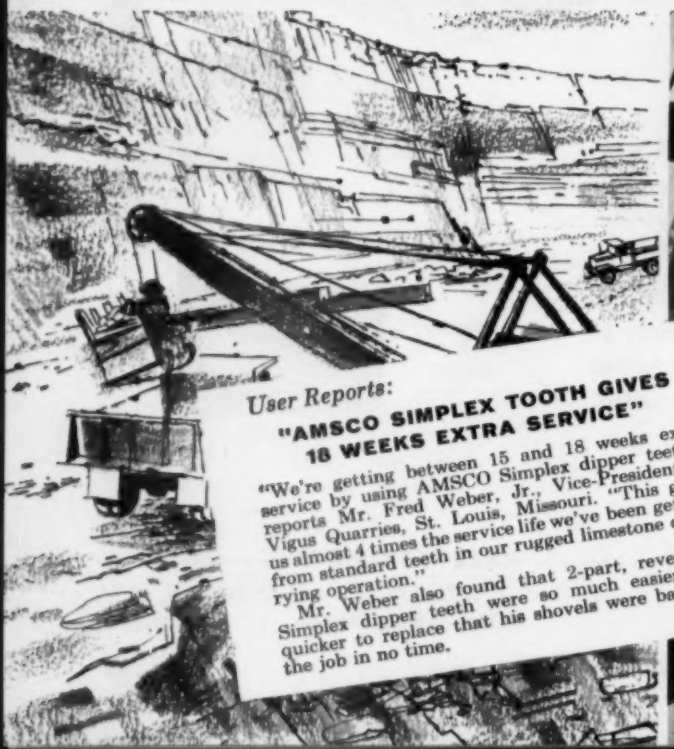
AXLE DIVISION
MANUFACTURING COMPANY
CLEVELAND, OHIO

How AMSCO helps you MOVE

User Reports:

"OVER 13 TIMES MORE SERVICE LIFE ...WITH AMSCO 'MML' ALLOY"

"Working in semi-molten slag at temperatures up to 1800°F., an AMSCO 'MML' ALLOY dipper front lasted 528 days. That's 13 times more service life than we got from the type previously used . . .; which gave a maximum of only 40 days' service." AMSCO "MML" ALLOY is a special combination of austenitic manganese steel and molybdenum, specifically developed for applications involving excessive heating as well as severe abrasion.



User Reports:

"AMSCO SIMPLEX TOOTH GIVES 18 WEEKS EXTRA SERVICE"

"We're getting between 15 and 18 weeks extra service by using AMSCO Simplex dipper teeth", reports Mr. Fred Weber, Jr., Vice-President of Vigus Quarries, St. Louis, Missouri. "This gives us almost 4 times the service life we've been getting from standard teeth in our rugged limestone quarrying operation."

Mr. Weber also found that 2-part, reversible Simplex dipper teeth were so much easier and quicker to replace that his shovels were back on the job in no time.

MORE TONS PER DOLLAR

For rugged digging, crushing, pumping, or rebuilding jobs... it pays to ASK for AMSCO!

AMSCO's sole job is to help you fight wear caused by impact and abrasion. AMSCO Manganese Steel—"the toughest steel known"—is today's number one choice for long-lasting dippers, dipper parts, crushers, tractor parts.

AMSCO Alloys, developed to meet unusual wear problems, add extra service life under special and very severe operating conditions.

AMSCO Hardfacing Materials permit economical build-up or repair of worn parts—at a fraction of the cost of new parts. Use this specialized know-how and broad line of "wear-fighting" products to help *your* equipment move more tons per dollar. Ask for AMSCO!

NOW...WELD MANGANESE AS EASILY AS MILD STEEL

"We're getting just the kind of welds and build-up we want with good cost saving to boot," says a user of Nicro•Mang rod. From all over, in a variety of hardfacing applications, reports of success with AMSCO NICRO•MANG are coming in. Users like the stable arc, and wide range of arc length . . . the non-popping, the easy removal of slag . . . and above all the fast build-up. For high strength, superior crack resistance, and easy welding, Nicro•Mang is unbeatable for fabrication and build-up of manganese steel.

"29 YEARS WITH THE SAME 8" AMSCO PUMP"

Haskell Peel, Plant Superintendent at Consolidated Gravel Company, Columbus, Georgia, has shared many experiences with his 8" AMSCO PUMP. One of his favorites is the time that he and his pump almost dried out a lake to recover a sunken dredge. He hooked the 8" AMSCO to more than 1,000 ft. of 10" pipe, and ran it continuously for three days. No wonder the pump is his pet . . . it's been doing the job, pumping 75% sand and 25% gravel, for more than 29 years.

AMERICAN Brake Shoe COMPANY

AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

Other Plants in: Denver • Los Angeles • New Castle, Dela. • Oakland, California • St. Louis
In Canada: Joliette Steel and Manitoba Steel Foundry Divisions
Welding products distributed by Canadian Liquid Air Co., Ltd.

PEOPLE IN THE NEWS

(Continued from page 26)

New staff member

IRENE DIANA WILLIAMS has joined the staff of ROCK PRODUCTS as editorial assistant. Mrs. Williams was graduated from the University of Wisconsin, Madison, where she was managing editor of the campus daily; and attended the New School for Social Research, New York. She served her journalistic apprenticeship on the *New York Post*.

Richter, Wirkus named by PCA's Los Angeles office

JOHN E. RICHTER has been appointed housing specialist in the Los Angeles office of the Portland Cement Association. With the association since 1956, Mr. Richter at that time was named a field engineer in Los Angeles. In his new duties in the housing promotion field, he succeeds George M. Petzar, who recently was named district engineer in charge of PCA's new Phoenix office.

The association's Los Angeles office also announced that Eugene A. Wirkus has been appointed a field engineer in the metropolitan Los Angeles area. He had been an associate highway engineer with the California Division of Highways.

Witt joins Connell

J. C. WITT, Chicago consulting engineer specializing in cement and concrete, has affiliated with Maurice H. Connell and Associates, a large architectural-engineering firm in Florida. Dr. Witt, author of "Portland Cement Technology," holds a series of patents dealing with the manufacture and use of portland cement. He is a graduate of the University of Chicago, the Illinois Institute of Technology and the University of Pittsburgh.

Leadabrand named at Portland Cement Assn.

JOSEPH A. LEADABRAND has been appointed assistant to the vice president of the Portland Cement Association, Chicago. He was formerly manager of the soil-cement bureau and succeeds Thomas E. Long, who was named eastern regional manager.

Mr. Leadabrand joined the PCA in 1936 as a soils engineer. He has served as supervisor of the soil and soil-cement testing programs as paving construction engineer. Since 1949 he was manager of the soil-cement bureau.

A graduate from the University of Illinois with a degree in civil engineering, Mr. Leadabrand is a member of the American Society of Civil Engineers, the American Concrete Institute and other engineering societies.

E. Guy Robbins succeeds Mr. Leadabrand as acting manager of the soil-cement bureau. He joined PCA in 1937 as a soils testing engineer and has served as research engineer, soil-cement field engineer and senior paving construction engineer. A graduate civil engineer of the University of Illinois, Mr. Robbins is a member of the American Concrete Institute.

Yard named at Dundee Cement Co.

BOYD W. YARD has been elected secretary-treasurer of the Dundee Cement Co., Dundee, Mich. Before joining Dundee late last year, Mr. Yard was associated with Arthur Andersen & Co. at their Detroit office as audit manager. A native of Clarks Summit, Pa., he was educated at the University of Michigan. During World War II, he served as lieutenant in the U. S. Navy.

Hill named at Maule

E. J. HILL has been named assistant to the president of Maule Industries, Inc. Mr. Hill comes to Maule from the Colton Chemical Co., Cleveland, a division of Air Reduction Corp., where he had been sales manager for three years. Previous to that, he had been associated with the Goodyear Tire and Rubber Co. for ten years, joining the firm as a sales representative in Detroit and eventually becoming district sales manager in Cleveland.

DeWitt named president of Genesee Stone Products

GENE A. DEWITT has been named president of Genesee Stone Products Corp., Batavia Washed Sand & Gravel Co., Inc. and Genesee Bituminous Products Corp., all of Batavia, N.Y. Former vice president of the firms, Mr. DeWitt succeeds the late Frederick W. McMillin, Jr., who recently died of injuries suffered in an auto accident.

Other officers named are James L. Holden, former secretary, who becomes vice president, Arthur O. Fricker, secretary and B. R. DeWitt, treasurer. Arnold W. Heisler continues as general superintendent.

Tibbs named at Gypsum

HAROLD E. TIBBS has been named quality superintendent of the Fort Dodge, Iowa, plant of the U. S. Gypsum Co., Chicago, Ill. Mr. Tibbs joined U. S. Gypsum in 1950 as quarry engineer. In 1953 he became mine superintendent at the Heath, Mont., plant, and later he was made board superintendent. A graduate of the Missouri School of Mines, Mr. Tibbs is a member of the American Institute of Mining Engineers.

Morgan, Bear, Atwood promoted at U. S. Gypsum

UNITED STATES GYPSUM CO. announced the appointment of three men to top administrative posts. Graham J. Morgan has been elected executive vice president, Henry C. Bear has been named vice president of merchandising and C. J. Atwood, manager of the firm's new Great Plains division. Mr. Morgan had been vice president of the nation's largest gypsum producer.

Mr. Bear, formerly vice president for purchasing, was in sales work during his first 10 years with the firm. With USG 19 years, Mr. Atwood has been assistant sales manager for paint products, sales manager, and then Dallas district manager. END

NEW DUAL "2-POINT" ADJUSTMENT INSURES MORE UNIFORM GRINDING, LONGER PARTS LIFE . . . . .

WILLIAMS *Reversible* HAMMER MILLS

Williams Reversible Hammer Mill with cover open. Note these features:

- Super-strong reinforced steel plate frame
- Renewable wear-resistant manganese steel liners
- Heavy duty oversize forged steel rotor shaft
- Anti-friction self-aligning roller bearings in dust-tight housings
- Complete accessibility to interior for quick parts changing

It's another Williams "first"—features not available in other hammer mills—that now makes it possible to maintain the original close clearances of *both* grinding plates *AND* cage sections against the rotating hammers. This easy-to-make "2-point" adjustment, in the most critical grinding area inside the hammer mill, gives absolute assurance of consistently uniform product quality.

In addition to the advantages of the Dual "2-Point" Adjustment, a Williams Reversible Hammer Mill substantially lowers upkeep expense by cutting hammer cost. Hammers can be operated in one direction today and another tomorrow simply by installing a simple reversing switch on the driving motor. Manual reversing of hammers no longer necessary. Grate bars also last longer. The double set of reversible manganese breaker plates, which last twice as long as other types, give four times the service! Maintenance and downtime are cut 50% or more.

Get all the facts about the hammer mill with *ALL* the top features.

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Roller Mills | Helix-Seal Mills | Air Separators | Vibrating Screens | Feeders | Impactors

WILLIAMS

CRUSHERS • GRINDERS • SHREDDERS

Oldest and Largest Manufacturers of Hammer Mills in the World

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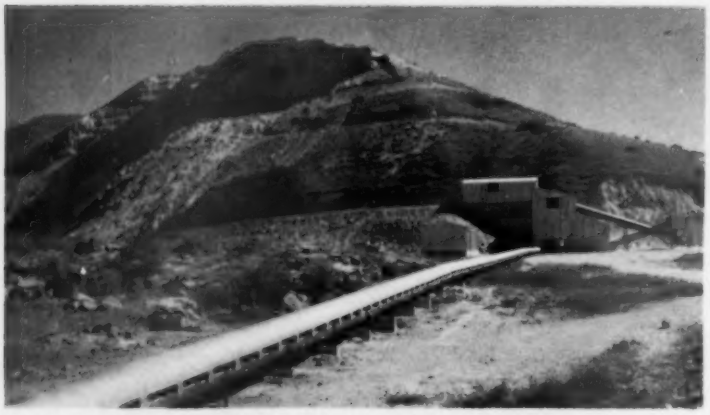
INDUSTRY NEWS



New field crushing plant and 825-ft. belt help Idaho Portland cut primary processing costs. New plant is midway between quarry and mill

Hudson, General Portland disclose plant expansion plans

MAJOR PLANT EXPANSIONS are announced by General Portland Cement Co., and Hudson Cement Co., for their plants at Tampa, Fla., and Kingston, N.Y., respectively. Idaho Portland Cement Co. and Louisville Cement Co. also disclosed plant-expansion plans.

Smith W. Storey announced a big 3-million bbl. expansion for General's plant at Tampa, which has capacity of 4 million bbl. at present. Included in the construction program, which has already begun, are a doubling of the plant's white cement capacity. The program is part of a modernization and expansion program which will cost $17 million.

Hudson Cement Co., with a brand new plant on the Hudson River at Kingston, is planning to more than double its capacity from 900,000 to about 2 million bbl. Owner Colonial Sand and Gravel Co., of New York City, built the plant last year to assure itself of a supply of cement for its many ready-mixed concrete plants. The expansion is set for completion by next March. Colonial president Anthony Pope said the internally financed added capacity would be marketed to other users of cement in the area.

Idaho Portland Cement Co. is cutting primary-processing costs with a new crushing plant set half-way between quarry and plant at Inkom, Idaho, Link-Belt Co. reports. A 20-in. belt conveyor carries the sized stone on the second half of its trip to the mill. By cutting quarry haul by 825 ft., Idaho Portland doubles the number of truck trips.

Firm gets lime supply from ground water

MOST OF ITS LIME REQUIREMENTS—50 tons a day—are being met by extracting the chemical from ground water by Buckeye Cellulose Corp., at Foley, Fla. Combined with the plant's water-softening setup, the lime-recovery equipment at the same time is eliminating a lime sludge disposal problem. Most important, of course, is the saving of up to $5,000 per month the firm expects to realize by supplying its own lime.

Water used at the Foley plant—40 million gal. per day—is taken from deep wells. It has a hardness rating of over 200 ppm. The plant's cold-lime softeners reduce this to 80 ppm., pulling out about 100 tons per day of $CaCO_3$ sludge, *Chemical Engineering* reports.

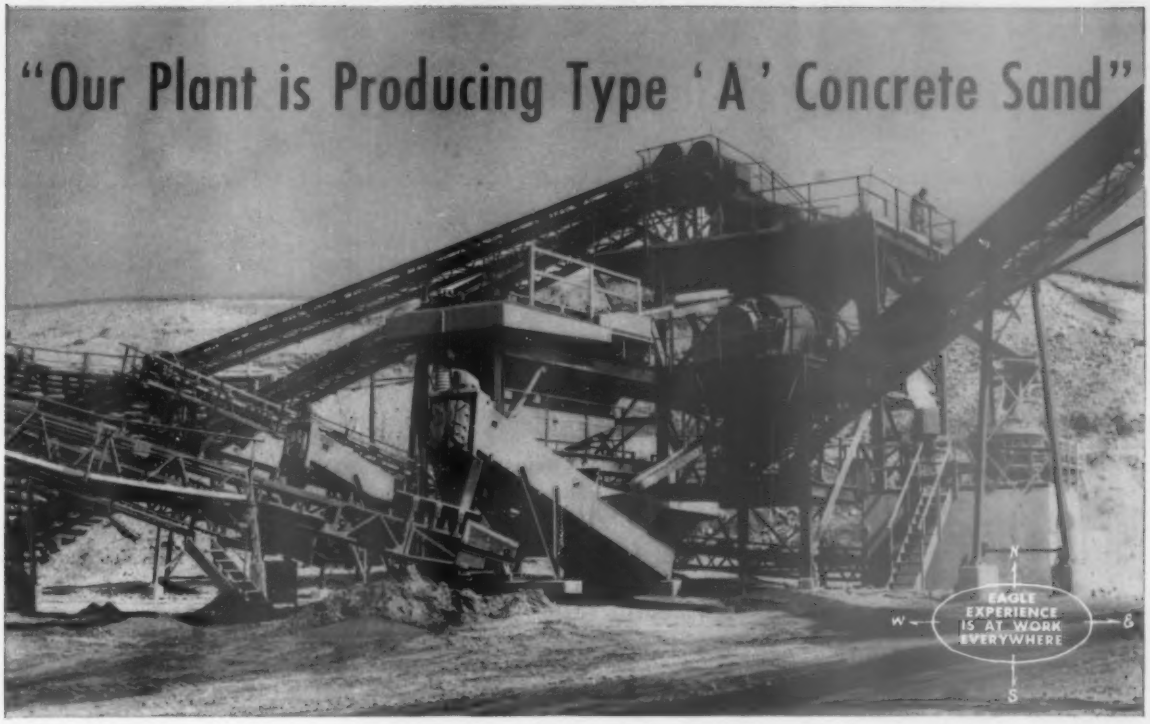
While magnesium compounds in the sludge caused trouble at first, carbonation followed by centrifugal classifying and dewatering provided a 60-percent solids cake largely free of the impurity.

Sayre & Fisher proposes extended light aggregate licensing

SAYRE & FISHER CO., Sayreville, N.J., producer of lightweight aggregates, plans to license more firms to use its sinter-grate manufacturing process. The firm reported its successful experience with North Central Lightweight Aggregate Co., Inc., Minneapolis, Minn., in designing and building a one-million-dollar, 700 tpd. Aglite plant.

Sayre & Fisher received a construction fee, gets a continuing interest in all production from the plant for 15 years and owns a 10 percent stock interest in the plant. The New Jersey firm reports applications for the construction of similar plants from the United States, Canada, West Germany, Australia and other countries.

(Continued on page 37)



reports Sullivan Highway Products Corp. Monticello, N.Y.

FRED STEIN, Plant Supt. of Sullivan Highway Products Corp's. Masten Lake plant in southern New York is very enthusiastic about the performance of the Eagle Washing-Classifying-Dehydrating Section at their plant. He reports that because of the simple and accurate control provided in the Eagle Equipment, it has been possible to maintain the exacting standards required by New York State Department of Public Works for concrete fine aggregate; with particular reference to gradation, and silt and loam content.

The easy-to-operate Eagle Section consists of a 20′ 2-cell water scalping-classifying tank with automatic bleeder valves and metering "splitter" gates which delivers classified material of correct water-sand ratio to two Eagle Fine Material Screw Washer-Classifier-Dehydrators for finishing. One is a 36″ dia. screw, the other 20″ dia. Both 25′ long.

These screw units are of latest Eagle design with ribbon in-feed for minimum turbulence and totally enclosed compound gear drive which runs in an oil bath and is sealed against water and dirt.

Eagle Experience and Service cannot be copied and down through the years this has made Eagle Equipment first in the industry. It is this Experience and Service that has aided producers over the years and helped so many to profit so well. If you produce aggregates surely Eagle can help you. Send for Catalog.

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Two TR-260's take over... cut hauling costs in half

Olen Humphres
Ashmore, Illinois

Olen Humphres, owner-operator of several quarries in central Illinois, replaced a fleet of six trucks with two Allis-Chalmers TR-260 rock wagons. His choice of equipment paid off. Actual on-the-job analysis showed a substantial increase in hauling production . . . an amazing 50-percent reduction in hauling costs.

The TR-260 wagon's big opening speeds loading cycle at quarry site.

Sharp turns, soft footing and 10-percent grades are taken in stride by TR-260 rock wagons.

A few years ago, Humphres used six trucks for all hauling work at his 520-acre limestone quarry in Ashmore. However, he was not satisfied with the results he was getting. His trucks had trouble working in muddy terrain, their maneuverability was limited in tight quarters, and hauling costs were out of line. These problems were solved when two TR-260 rock wagons replaced the six trucks and cut hauling costs in half.

TR-260's work where trucks can't go

Today, three TR-260's working a typical 6-month schedule, move approximately 300,000 tons of limestone from quarry to crusher over a 3,250-ft. course. About 50,000 tons of this material is stockpiled.

Hauling 18-ton loads, the "260's" move up 10-percent grades, often through soft, muddy underfooting. Big low-pressure rock tread tires provide excellent traction and flotation . . . keep the TR-260's riding high where trucks sank axle deep. Positive hydraulic steering lets the operators "duck walk" out of extremely soft spots when a straight-ahead pull won't do the job.

Fast-acting hydraulic system provides 90-degree steering to the left or right for quick, smooth spotting under power shovels and at the hoppers.

AC

move ahead with ALLIS-CHALMERS...

Operator dumps load over steep edges confidently, safely—big air brakes are applied to all four wheels simultaneously. After dumping, approximately ⅔ of the TR-260's weight is on its drive wheels for safe, fast acceleration.

The TR-260's 21-in. tractor underclearance greatly reduces the danger of hanging up on high spots . . . eliminates the problem of getting stuck in soft material. The T-260 tractor bottoms are covered by heavy-duty steel plates. There are no exposed differentials, shafts, or axles to break.

"You can't wear 'em out"

Olen Humphres' choice of Allis-Chalmers rock wagons goes back to his success with Allis-Chalmers power units.

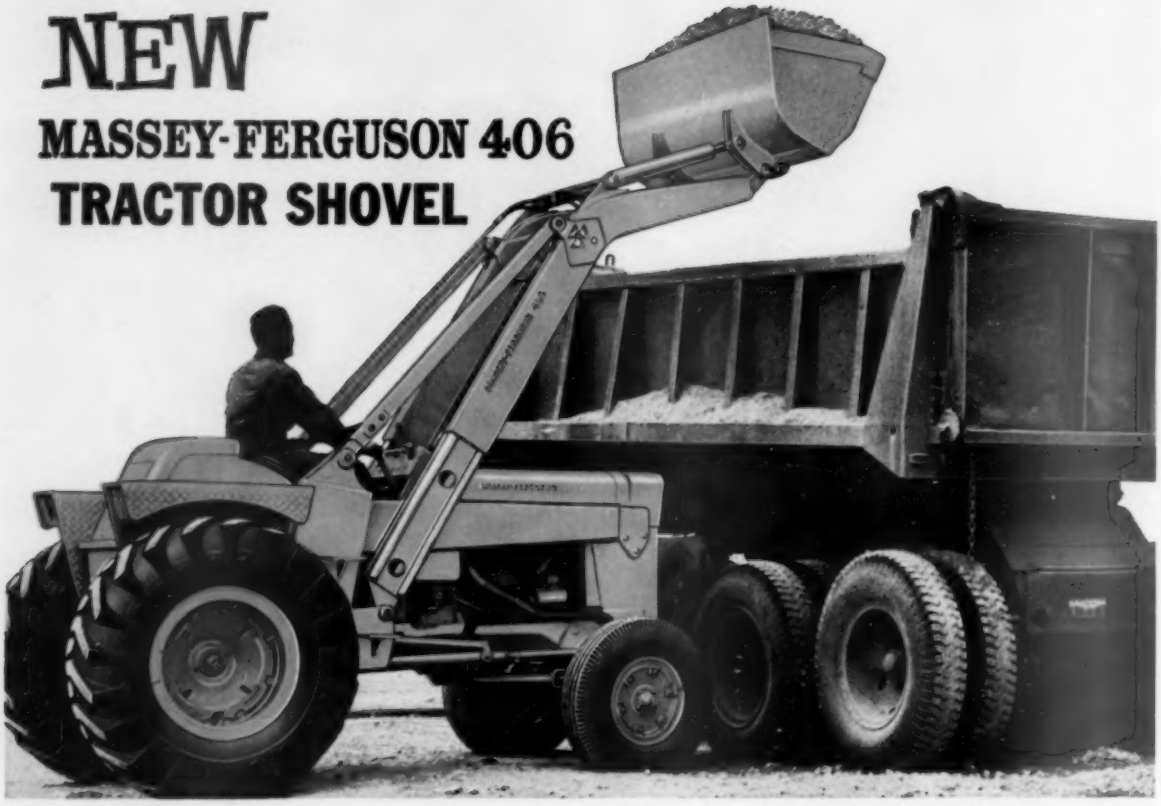
"You can't wear 'em out," Humphres explains. "One of my Allis-Chalmers engines has been working for me since I started quarrying some 21 years ago."

Today, in addition to the TR-260's, Humphres uses a 150-hp HD-16 crawler tractor and 20-yd pull-type scraper for stripping overburden. From 5 to 30 ft of overburden must be removed to work the limestone. The HD-16 and two other Allis-Chalmers tractor-dozers handle earth-moving, push-loading and stockpiling assignments. There are four Allis-Chalmers power units on the job. The largest unit, 390-hp, supplies power for the crusher.

Your Allis-Chalmers dealer will show you, by actual demonstration, how the TR-260 can speed your hauling. He also will tell you how the R-260 rock wagon can be interchanged with the S-260 scraper for added work and profits. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

. . . power for a growing world

NEW
MASSEY-FERGUSON 406 TRACTOR SHOVEL



more loads... better loads... greater profits... because

Here's the BIG CHANGE in tractor shovels — the all-new, streamlined Massey-Ferguson 406 1 cu. yd. tractor shovel. Now you increase your capacity with less investment. This rig does more BIG work in a day than machines that cost 50% more...yet it handles your utility jobs economically and efficiently.

X ***instant reversing***
Means faster cycling — no shifting no clutching...no levers to pull

X ***up-front visibility***
See at all angles — front, rear, both sides

X ***low thrust point —***
for direct push into the load, but high reach — 126" at hinge point

X ***compare***
Price...quality...performance

There's loading power at your finger tips...speed and directional control at the touch of your toe...and maximum visibility wherever you go. Instant reversing, low thrust point, high reach are just a few of its features. Integrated attachments — including the famous Davis Backhoe — give it unparalled versatility.

ask for a Trial Demonstration without Obligation

Compare and weigh the facts. Ask your Massey-Ferguson Industrial Dealer for a demonstration. You'll see it's worth buying.

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INDUSTRY NEWS

(Continued from page 32)

Production of cement, lime, gypsum all rise sharply

PRODUCTION OF CEMENT, lime and gypsum followed the rising construction curve during the year's early months, the Bureau of Mines reports. For example, portland cement production through April was up a healthy 19 percent, from 1958. Biggest gains in production, some more than 50 percent above April, 1958 marks, came in the West and Southwest areas.

Sales of open-market lime in March reached a record 863,000 tons, the Bureau reports. This is 21 percent above the previous month and 44 percent above March, 1958. Gains were recorded in all categories, but the chemical and industrial uses headed the increases.

Gypsum production, too, was running at high levels. Domestic crude production for the first quarter was 2.33 million tons, 19 percent over the same 1958 quarter. The Bureau of Mines noted that wallboard production was up a smart 21 percent for the quarter. Industrial and building plasters increased 11 and 2 percent respectively. Finally, portland cement retarder (up 30 perce..t) and agricultural gypsum (up 33 percent) recorded other production gains.

Cement makers agree to wage, fringe boosts

EIGHT CEMENT COMPANIES had agreed at press time to a new contract with the Cement, Lime and Gypsum Workers International Union. Wage increases granted include a 10-cent an hour boost retroactive to May 1, with a second 10-cent boost next May 1, union officials reported. The two year contract had been signed, at press time, by Ideal Cement Co., Penn-Dixie Cement Corp., Lone Star Cement Corp., California Portland Cement Co., Riverside Portland Cement Co., Permanente Cement Co., Southwestern Cement Co. and Aetna Portland Cement Co., according to the union.

Further benefits in the new contract are of the "fringe" type, and include: the company pays 65 percent of major medical expense coverage; contributes three cents an hour in supplemental unemployment benefits for the first year of the contract, with a possible boost to five cents next year; and a three-week vacation after 12 years' service beginning January 1, and after 10 years beginning January 1, 1961. The present requirement is 15 years. *(Continued on page 38)*

ANOTHER FLEXCO SPLICE DOING A DEPENDABLE JOB AT *MATERIAL SERVICE CORP.*

Picture courtesy of Material Service Corp., Yard #15, Lockport, Ill.

Cutaway of a Flexco application showing compression plates, teeth and precision-made bolts and nuts.

Belt maintenance crews like to work with Flexco fasteners because they are easy to apply — joints last a long time — worn plates can be replaced quickly — ideal for repairing rips and tears.

PROTECT YOUR INVESTMENT IN CONVEYOR BELTS WITH FLEXCO . . . The quality fastener for all heavy-duty conveyor belt applications: SAND & GRAVEL, CRUSHED ROCK, COAL & METALS, CONSTRUCTION EQUIPMENT, etc.

Available in Steel, Monel, Stainless, Everdur. Also Promal top plates.

NEW "25-PAK"

"25-PAK" contains enough fasteners to join common belt widths.

ORDER FROM YOUR DISTRIBUTOR, OR WRITE TO US FOR BULLETIN F-112.

"FOR THE SPLICE OF A LIFETIME"

Flexible STEEL LACING COMPANY

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that's what you want in a fuel...

what you get in B&O Bituminous!

Sure, bituminous coal is power-packed—it's prepared to suit any industrial utilization—its source is most convenient to industry. But, bituminous gives you the *extra* that no other fuel can—*nearly inexhaustible reserves, always available!*

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B&O BITUMINOUS COALS FOR EVERY PURPOSE

Ask our man! BALTIMORE & OHIO RAILROAD
BALTIMORE 1, MD., Phone: LExington 9-0400

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INDUSTRY NEWS

(Continued from page 37)

Phosphate industry fears losing foreign markets

BOOSTED PRODUCTIVITY is absolutely necessary if the U. S. phosphate industry is to keep its costs low enough to compete with Moroccan and Russian producers, an industry official said recently. Chairman Louis Ware of International Minerals and Chemical Corp., Chicago, warned that shipments of low-cost phosphate from the two countries may seriously hurt the U. S. export business.

In a talk before a Lakeland, Fla., group on its civic day honoring the industry, Mr. Ware said high grade deposits and very low labor costs, plus nearness to European markets, give the Moroccan industry an advantage. And he noted that the Russians sell phosphate at any price they choose, and have already taken some Japanese business away from his firm. About 25 percent of Florida's phosphate production is marketed overseas each year. About 10 million tons are produced in the state annually, two-thirds of U. S. production.

Government cracks down on water-polluting firms

THE FEDERAL GOVERNMENT is cracking down on water pollution on a big scale, according to Arthur Flemming, Secretary of Health, Education and Welfare. In an interview with *Chemical and Engineering News*, Mr. Flemming said efforts are being concentrated in six major river basins. They are the Missouri, Potomac, Ohio, Delaware, Arkansas-Red and Columbia. The article points out that the Secretary can request the Attorney General to take court action if an offender fails to comply with an HEW cleanup directive.

Canadian light aggregates plant starts production

BRITISH COLUMBIA LIGHTWEIGHT AGGREGATES LTD. planned to complete construction of its expanded shale plant on Saturna Island, B.C., last month. First piece of equipment installed was a 10 x 120-ft. rotary kiln. The plant, near Vancouver, B.C., will supply lightweight aggregate to concrete block and ready-mix producers in British Columbia.

(Continued on page 43)

B.F.Goodrich

B.F.Goodrich tires help contractor speed rugged construction of Glen Canyon Dam

MIGHTY Glen Canyon Dam—world's third highest—will tower 700 feet above the bedrock of the Colorado River in northcentral Arizona. Before this massive project can be completed, millions of tons of rock, sandstone, aggregate and other materials must be moved over rocky haul roads.

To help keep this rugged job on schedule, Merritt-Chapman & Scott Corporation, general contractor, relies on B.F.Goodrich tires and service—uses 47 different types and sizes of tires on 23 different types of equipment that work 'round the clock. For example, M-C&S uses B.F.Goodrich Rock Service tires on belly dump trucks (above).

B.F.Goodrich builds the Rock Service for just this kind of work. Husky double-chevron cleats pull in forward or reverse, defy rock cuts and bruises. B.F.Goodrich FLEX-RITE NYLON cords withstand double the impact of ordinary cord materials, resist heat blowouts and flex breaks. Result: This B.F.Goodrich cord body outwears even the extra-thick tread, can be retreaded over and over.

Other B.F.Goodrich products at work at Glen Canyon include conveyor belting, air hose and fire hose. Special maintenance and service for tires and industrial products are also in operation—all part of the new B.F.Goodrich Unified Contractor Program. No matter what your off-the-road job, B.F.Goodrich is ready to serve you—and help you save. Your Smileage dealer is listed under Tires in the Yellow Pages of your phone book. *The B.F.Goodrich Co., Akron 18, Ohio.*

Specify B.F.Goodrich Tubeless or tube-type tires when ordering new equipment

Smileage!

B.F.Goodrich *off-the-road tires*

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"I've seen our Ford Tandems pull out where others couldn't"

says Walter E. Carlson, President
Park Construction Company, Minneapolis, Minnesota

"We're still using the first Ford Tandems we bought in 1954!

"In the construction business, our trucks really take a beating. They have to be rugged and durable, and that's why we like our Ford Tandems. On one of our earth moving jobs, for example, our Ford T-800's are in constant operation an average of ten hours each day, traveling about two hundred miles. They climb out of the pit, loaded with twelve yards of dirt, and walk right up a 12% grade. In fact, I've often seen our Fords pull out of places where other trucks couldn't.

"My father, who started the business back in 1910 with a horse and wagon, bought one of the first Ford Trucks ever made. That was over 44 years ago—and we've used Ford Trucks ever since. We pioneered the use of Ford Tandem Axle Trucks in this area in 1954. Now we have a total of forty trucks, including thirty-five Fords.

"We completely overhaul our trucks at the end of each construction season. That way we keep them in top operating condition and they last longer. We like Ford service, too, because we don't have to tie up our money in a large parts inventory. We can always get the parts we need quickly from our Ford Dealer."

FORD TRUCKS COST LESS

One day in five... GAS FREE!

Sun.	Mon.	Tues.	Wed.	Thurs.	FREE DAY	Sat.
	1	2	3	4	5	6

LESS TO OWN . . . LESS TO RUN . . .
LAST LONGER, TOO!

'59 FORD PICKUPS GIVE 25.2% MORE MPG!

25.2% advantage delivered in Economy Showdown Tests means five days' driving on four days' gas

The nation's leading automotive research organization* proved and certifies that a '59 Ford Six Pickup will run five days on the same amount of gas the average competitive '59 pickup burns in four days.

The tests were made on 1959 six-cylinder ½-ton pickups of the six leading makes purchased from dealers – just as you would. The trucks were tested in every kind of driving–high and low speeds, open highway and city streets, even simulated door-to-door delivery. And in every test '59 Ford Sixes delivered more miles per gallon than any other make.

Here are the actual percentages:

HOW NEW '59 SIXES RATE IN GAS MILEAGE

'59 FORD SIXES GIVE	25.2% more miles per gallon than Make "C"	31.1% more miles per gallon than Make "I"	9.6% more miles per gallon than Make "G"	42.6% more miles per gallon than Make "D"	22.0% more miles per gallon than Make "S"	25.2% more miles per gallon than the average of all makes

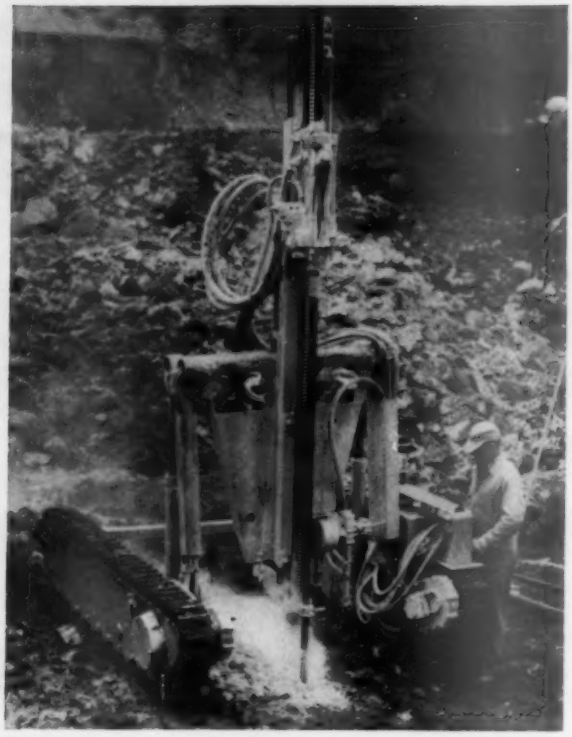
What's the secret of Ford's economy? First, of all pickup sixes, only the Ford Six has modern Short Stroke design which reduces engine friction and thus requires less fuel. Second, to this modern engine, Ford has added a new economy carburetor to meter fuel more precisely in both high- and low-speed ranges.

Your Ford Dealer has the complete report of Economy Showdown U.S.A. See him and get the whole story firsthand.

GO FORD-WARD for savings!

**Name available on request.*
Send inquiry to P.O. Box 2687, Detroit 31, Michigan

The 450-DR is available on several self-propelled carriers, including the completely automatic TDM Trac-Drill shown at the right.



Another Joy First

The 450 DUAL Rotation Drill

- **25% Higher Drilling Speeds**
- **Faster Steel Changes**

In competitive demonstrations of 4½" bore drills, the new Joy 450-DR not only drilled faster, but also finished blastholes which the conventional reverse rotation machines could not bottom.*

Dual Rotation, which made this superior performance possible, is provided by a powerful vane-type air motor geared to the chuck. It provides a booster to normal drilling rotation, and gives extra rotation power while actually reducing the strain on the rifle bar.

Dual Rotation will also cut your costs because (1) there is no hammering action while coupling or uncoupling—drill steel threads, couplings and striking bars last longer; (2) all four pawls in the 450-DR are used only for forward rotation, not two for drilling and two for reversing—excessive pawl wear is eliminated; and (3) with Dual Rotation, reversing is not rifle bar actuated, therefore rifle nuts cannot back off—less downtime.

Let us prove the superiority of the new Joy 450-DR Drill. Your nearest Joy Office or Distributor will be glad to arrange a demonstration of this remarkable new drill.

C 7577-316

*Competitive test results available upon request.

JOY CONSTRUCTION EQUIPMENT IS SOLD AND SERVICED BY THE JOY DISTRIBUTOR IN YOUR AREA

JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

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(Continued from page 38)

Australia, Italy boast bigger cement industries

AUSTRALIAN CEMENT-MAKING CAPACITY has nearly trebled since 1945, and Italian capacity has more than doubled since 1951, reports reaching ROCK PRODUCTS indicate.

Australia now has 14 plants with capacity of about 16 million bbl., *Quarterly Survey* indicates. Per-capita yearly consumption reached 1.4 bbl. as opposed to 1.7 bbl. in this country in 1957, the magazine reports.

Italian Trade Topics, published by the Italian Embassy in Washington, D.C., reports that that nation's capacity reached 74 million bbl. last year. And the level will rise another 8.5 million bbl. this year as six new plants are completed. Italy is the seventh largest cement-producing nation.

Percentage depletion decision made on bags

THE COST OF BAGS may be included in determining the percentage depletion allowance on a very finely powdered limestone product, the U.S. District Court for the West District of Texas has recently decided. In a case involving the Texas Carbonate Co., the court ruled that the bags were necessary to market the product (97 percent passing 325 mesh) so their cost can be included. The limestone product here is used in paints, wallboard and as a calcium supplement in livestock feeding and other purposes.

Basic's Chillicothe, Ohio, gravel operation abandoned

A FLOOD IN JANUARY and subsequent operational difficulties have made it uneconomical to continue production at the Chillicothe, Ohio, gravel plant of Basic Construction Materials Div. of Davon, Inc., reports Basic president Robert H. Patton.

For this reason, the equipment at the plant is being sold. It includes 24-in. conveyors and belts, a bottom-dump wagon, two clamshell cranes, two disintegrators, an impact crusher, several screens and other equipment. The flood did not damage the equipment, Mr. Patton reports. Interested parties should contact Mr. Patton at Davon, Inc., Box 5765, Columbus 21, Ohio.

(Continued on page 46)

NEW SERIES 350 BANTAMS

...fastest producing all-around performers their size ever to work the pits!

The all-new BANTAM Series 350 introduces to pit operations the greatest combination of high-income essentials yet offered.

Think of it! BANTAM's famed low-cost, top-dependability advantages, now ready and waiting for you in this bigger-production series—carrier, crawler and self-propelled models. Capacity is greater! For the carrier model shown you can handle 11-ton loads . . . work with ⅜- or ½-yd. dragline bucket . . . heap up production with ⅜- or ½-yd. digging shovel buckets and ⅛-yd. rehandling dippers. You've never dug so fast in hard materials or loaded so rapidly out of stockpile before with any machine anywhere near BANTAM's popular, go-anywhere practical size!

BIG OPTION CHOICE REWARDS YOU MORE

With the job-proved new BANTAMS *you* get the choice of features you want in a modern, big-capacity crane-excavator! Select *exactly* what your jobs call for . . . only what your budget permits: gasoline, diesel, LP-gas power . . . torque converter . . . 2-speed transmission . . . house-type or all-vision cab . . . in-cab digging lock (crawler model) . . . plus lots more, all in addition to 11 different quick-change BANTAM-built attachments to extend your job income range.

ASK YOUR BANTAM DISTRIBUTOR FOR A BANTAM JOB-TRYOUT NOW!

BANTAM C-350
crawler model . . .
7-, 8-ton capacity

BANTAM CR-350
self-propelled model . . .
11-ton capacity

SCHIELD Bantam Co.

Schield Bantam Co. RP-229
216 Park Street, Waverly, Iowa
Please rush me information on the new BANTAM 350 Series:
☐ carrier mounted BANTAM,
☐ crawler mounted BANTAM,
☐ self-propelled BANTAM.
Name.....
Title.....
Company.....
Address.....
City.....Zone....State.....

WORLD'S LARGEST PRODUCER OF TRUCK CRANE-EXCAVATORS

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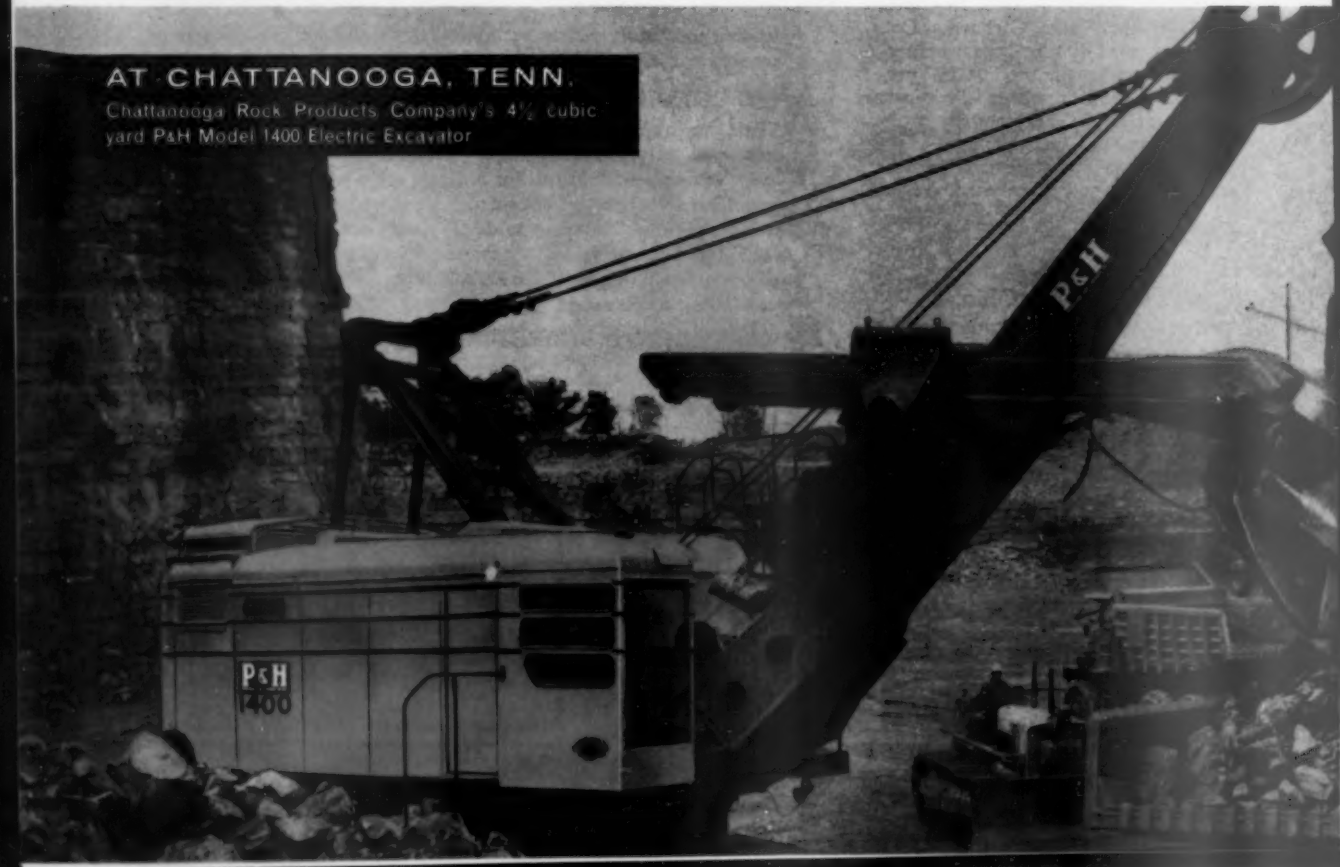
AT McCOOK, ILLINOIS

Consumer Company's 5 cubic yard P&H Model 1500 Electric Excavator

WITH VULCAN MATERIALS COMPANY



AT CHATTANOOGA, TENN.

Chattanooga Rock Products Company's 4½ cubic yard P&H Model 1400 Electric Excavator

One P&H always sells another because

P&H "PROFIT·TONS" reduce loading costs all day...every day

Up to 30% higher bail pull for more uniform dipper speed in the pile—faster swing—exceptional physical strength of P&H welded construction—greater job availability all add up to as much as 10% more production, lower loading cost per ton and *more net profit* for owners of P&H Electric Mining Excavators.

P&H "Profit-Tons" are the end product of these *exclusive* P&H design principles:

MAGNETORQUE® . . . the most productive digging motion drive known for electric excavators. This patented P&H hoist drive electro-magnetically transmits the full digging power of an A.C. hoist motor direct to the dipper *without motor generator set conversion to D.C. current.* It gives higher bail pull, greater dipper fill factor and automatic impact protection to the digging machinery.

ELECTRONIC CONTROL . . . this patented P&H control accomplishes the quickest work motion reaction time known on electric shovels. Control maintenance expense is reduced as much as 80% by elimination of all moving parts for a completely closed circuit system.

In addition, with P&H—and only with P&H—do you get the service assurance of single source responsibility. P&H manufactures their own electrical as well as mechanical components—*designed specifically for electric excavator service.* Write Dept. 558A, Harnischfeger Corporation, Milwaukee 46, Wisconsin.

P&H LINE:

Electric Excavators:	3½ through 10 yds.
Diesel Excavators:	¼ through 3½ yds.
Truck Cranes:	10 through 80 tons

P&H **MINING EXCAVATORS**

HARNISCHFEGER CORPORATION
Construction & Mining Division
Milwaukee 46, Wisconsin

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If you want to know what you're going to run into below the surface . . . and just what equipment you will need to do the work properly and save you money . . . your call for exploratory drilling should be aimed at SPRAGUE & HENWOOD INC. They have a wealth of experience and modern equipment ready to serve you. Well-trained personnel, adequate supervision and the latest in machinery, all tend to assure you the results you are looking for.

Don't just build without foundation investigation . . . find out what's down there, first . . . and let SPRAGUE & HENWOOD find it out for you . . . You'll know what's there, before you know it.

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ATLANTA • GRAND JUNCTION, COLORADO • BUCHANS, NEWFOUNDLAND

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INDUSTRY NEWS

(Continued from page 43)

PCA issues safety film

A MOVIE entitled "Growing Pains" is available to firms interested in promoting plant safety. Produced by the Portland Cement Association, the 33-min. film digs deep into the human rather than the mechanical causes of accidents to explain how they can be prevented.

The safety value of teamwork, observance of rules and instruction, discipline and due regard for consequence are shown. Central figure is a worker who learns from his 11-year-old son an effective lesson in growing up to his safety responsibilities. It is available from Portland Cement Association, 33 W. Grand Ave., Chicago 10, Ill.

Texas Portland reports sales up sharply

TRUSTEES for the reorganized Texas Portland Cement Co., Echo, Tex., report that the firm operated almost constantly during 1959 through May, and that sales through April were 22 percent above the figure for the last six months of 1958. Trustees Chilton O'Brien and Martin Davis also said that a new clinker storage building was set for completion by September, and that the need for more finished-cement storage capacity was being studied.

Railroads ask permission to haul cement by truck

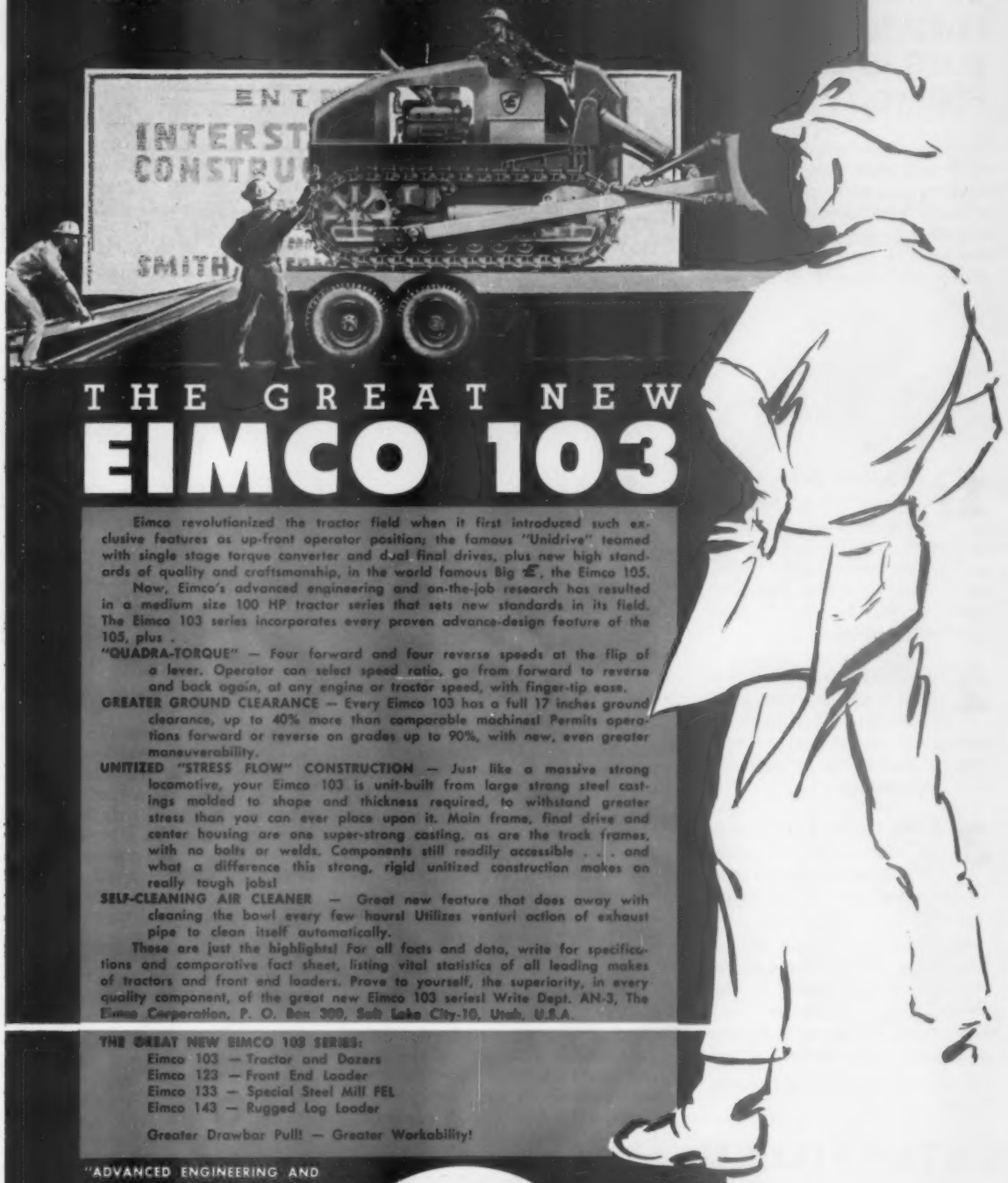
"WE'RE IN A DOGFIGHT HERE," one eastern railroad man told *The Wall Street Journal* recently. He referred to the effort of five eastern rail haulers to get Interstate Commerce Commission permission to ship cement by truck from plants in their areas. The five are the Pennsylvania, Baltimore & Ohio, Reading, Lehigh Valley and Western Maryland.

Realizing that the truckers are likely to gain more cement business at their expense, the railroads have made the proposal. Previously they usually have been granted permission to go into trucking only in a supporting role to their rail operations. Now they hope to truck finished cement in operations completely separate from their rail operations. The fact that the cement industry is growing in the East, while another important bulk material—coal—is dropping in tonnage shipped, has caused the rails to fight to keep the business.

(Continued on page 48)

...it's here!

engineered and built for your job



THE GREAT NEW EIMCO 103

Eimco revolutionized the tractor field when it first introduced such exclusive features as up-front operator position; the famous "Unidrive" teamed with single stage torque converter and dual final drives, plus new high standards of quality and craftsmanship, in the world famous Big E, the Eimco 105.

Now, Eimco's advanced engineering and on-the-job research has resulted in a medium size 100 HP tractor series that sets new standards in its field. The Eimco 103 series incorporates every proven advance-design feature of the 105, plus .

"QUADRA-TORQUE" — Four forward and four reverse speeds at the flip of a lever. Operator can select speed ratio, go from forward to reverse and back again, at any engine or tractor speed, with finger-tip ease.

GREATER GROUND CLEARANCE — Every Eimco 103 has a full 17 inches ground clearance, up to 40% more than comparable machines! Permits operations forward or reverse on grades up to 90%, with new, even greater maneuverability.

UNITIZED "STRESS FLOW" CONSTRUCTION — Just like a massive strong locomotive, your Eimco 103 is unit-built from large strong steel castings molded to shape and thickness required, to withstand greater stress than you can ever place upon it. Main frame, final drive and center housing are one super-strong casting, as are the track frames, with no bolts or welds. Components still readily accessible . . . and what a difference this strong, rigid unitized construction makes on really tough jobs!

SELF-CLEANING AIR CLEANER — Great new feature that does away with cleaning the bowl every few hours! Utilizes venturi action of exhaust pipe to clean itself automatically.

These are just the highlights! For all facts and data, write for specifications and comparative fact sheet, listing vital statistics of all leading makes of tractors and front end loaders. Prove to yourself, the superiority, in every quality component, of the great new Eimco 103 series! Write Dept. AN-3, The Eimco Corporation, P. O. Box 300, Salt Lake City-10, Utah, U.S.A.

THE GREAT NEW EIMCO 100 SERIES:

Eimco 103 — Tractor and Dozers
Eimco 123 — Front End Loader
Eimco 133 — Special Steel Mill FEL
Eimco 143 — Rugged Log Loader

Greater Drawbar Pull! — Greater Workability!

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Only your Caterpillar Dealer offers you these three protected buys on used equipment. Which is best? That depends on how you want to use a unit and what you want to pay. Whatever you want, you'll find it in his lot.

1 **A "BONDED BUY"** on used Cat-built equipment is your safest buy. A bonded guarantee, up to $10,000, of satisfactory performance on *all* parts is given when you purchase a "Bonded Buy" used Cat-built machine.

2 **A "CERTIFIED BUY"** covers units of any make in good condition. This type of protection carries your dealer's written guarantee of satisfactory performance.

3 **A "BUY AND TRY"** deal is just what its name implies. This protects you with your dealer's written money-back agreement.

You *know* what you're buying from your Caterpillar Dealer. You'll find him listed in the Yellow Pages. Visit his Used Equipment headquarters for the best buys in the market!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR

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BEST BUYS IN NEW AND USED EQUIPMENT

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INDUSTRY NEWS

(Continued from page 46)

Italian cement plant to use steel-mill slag

A NEW CEMENT PLANT to have a productive capacity of more than 500,000 tons per year is being built in Arquata Scrivia, about 30 miles north of Genoa, Italy, in the Apennine Range. The plant, to be operated by Cementir, is scheduled for completion by the end of 1960.

The plant will cover almost 200,000 sq. yd. and will consist of 10 buildings and 10 silos. All 10 silos are reportedly already finished and 4 of the buildings are completed except for the installation of the cement-making equipment. There will be facilities for shipping both bagged and bulk cement, and a railroad spur and a highway connection will be provided.

The plant will employ 250 men and will depend primarily upon slag from Genoa's Cornigliano steel mill for its raw material. The plant will also use limestone and gypsum, both of which can be mined locally. It is estimated that at Lagoscuro, about 11 miles away, there are 15 million cu. m. of limestone.

Cementir is an IRI—government-owned—cement producer, while Cornigliano is an IRI steel producer.

Material Service, General Dynamics agree on merger proposal

Henry Crown

Frank Nugent

Lester Crown

IN A MOVE which gives one party vast research and engineering skills, and the other a growing commercial business not tied to the defense effort, General Dynamics Corp. and Material Service Corp. agreed on June 26 to merge. Subject to approval of the stockholders of both firms, the big transaction would be carried out by an exchange of stock. Dates of the stockholder meetings required and other details remained to be worked out.

One of the nation's largest aggregates and concrete products producers, Chicago-based Material Service Corp. had sales of $114 million last year. One recent tabulation placed the firm's total number of rock and concrete plants at 29, including 12 aggregates, 12 ready-mixed concrete and 3 lime operations. The firm's opportunities for growth and new product development are boosted by the merger. Management and personnel will remain the same, chairman Henry Crown noted. Headquarters of the new division of General Dynamics will remain in Chicago.

General Dynamics Corp. is one of the nation's top defense contractors, with products including several of the atomic submarines, the Atlas intercontinental ballistic missile and the B-58 supersonic bomber. Lately the firm has been working to get a better balance between defense and commercial business, and is developing such promising products as the Convair 880 commercial jet transport and the "Triga" nuclear research reactor. Dynamics' General Atomic Division has proposed a new simple, low-cost high temperature gas cooled reactor for generating electric power. Congress recently approved the program of 52 private utility firms to build such a reactor to supply electricity to the customers of the Philadelphia Electric Co. Finally, Dynamics is spending $10 million on a research program which would adapt controlled nuclear fusion to industry.

Mr. Crown noted that he will remain chairman of new division, Frank Nugent will remain president of the Freeman Coal Mining Corp. division and Lester Crown will continue as president of the Marblehead Lime Co. affiliate. *(Continued on page 50)*

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Special report to Caterpillar D8 Tractor owners:

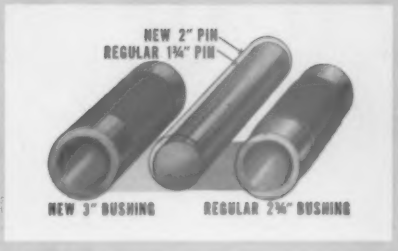
CAT CATERPILLAR

Parts you can trust
Dependable round-the-clock service

NEW TRACK COMPONENTS AVAILABLE FOR MOST D8 TRACTORS... GIVE UP TO 44% LONGER LIFE

Caterpillar's continuous research and testing pay off for you with the development of superior D8 track components. The next time you replace track parts, specify these new components. They last longer and require less maintenance. Here's what's available for 2U, 13A, 14A and 15A tractors:

30% STRONGER PINS AND BUSHINGS have more wear area to extend life. The big track pins are ¼" larger in diameter and heat-treated deep to resist wear . . . pins will not bend and cause uneven wear. The large contact areas of the bushings are hardened deep, both inside and out. Under field conditions these bushings have lasted up to 44% longer than regular bushings.



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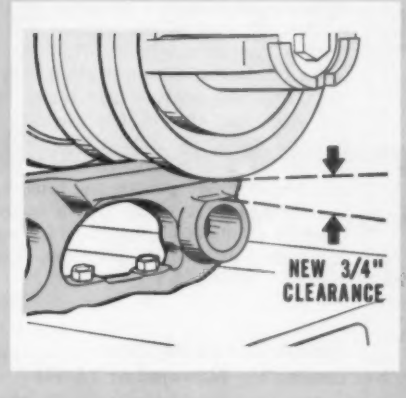
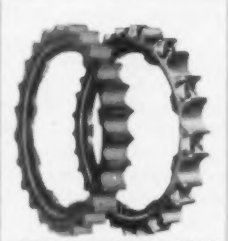


STRONGER, LONGER, HIGHER TRACK LINKS are 3 lb. heavier, 1" longer and ¼" higher. New length means fewer track sections are required. Increased height gives up to ¼" more *link pin boss-roller flange* clearance. Improved steel used in these links permits 80% deeper rail hardening and greater strength —pins and bushings stay tight *in the links* even under the roughest application.

• • •

NEW TRACK SHOE GROUSERS ARE 20% THICKER at the tip and are hardened much deeper than on regular shoes. The new shoe as a whole is bigger and heavier to resist bending, impact and wear. Track hardware used with the new track components is stronger—bolt diameter increased from ¾" to ⅞".

• • •



NEW DESIGN BORALLOY SPROCKET REPLACEMENT RIMS are available to accommodate the increased pitch of the longer links and bigger track bushings. Teeth are precision-machined to provide exact fit with track bushings—a major contribution to longer bushing life.

SEE YOUR CATERPILLAR DEALER for more information on extending your D8 track life. He has parts you can trust and round-the-clock service. See him today.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A. **CATERPILLAR**

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Constant Suction! Complete Collection!

SLY DYNACLONE®

The Dust Filter for Continuous Processes

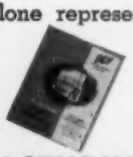
Just turn this dust filter on and forget it. The Dynaclone operates continuously, 24 hours a day. It maintains constant, uniform suction at dust sources, reclaims all the dust to prevent air pollution and damage to plant equipment.

The Dynaclone has *new* "Resist-O-Wear" filter bags (patent pending) that give as much as three times longer bag life . . .

It has a new roller cleaner for simplified automatic self-cleaning. Resilient rubber rolls form a positive dust seal as each row of bags is cleaned by atmospheric air drawn in by the main operating fan.

And it contains more cloth per cubic foot of filter than any other make . . . greater filtering capacity with smaller space requirements.

Learn the many reasons why the Dynaclone represents a new high in dust filter efficiency . . .



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INDUSTRY NEWS

(Continued from page 48)

General and Consolidated stockholders OK merger

STOCKHOLDERS of General Portland Cement Co. and Consolidated Cement Co. approved the merger of the two firms in meetings April 28 and 29. Directors of the two companies are now members of the board of the combined company. The merger makes the firm fifth largest in annual capacity among U. S. companies producing portland cement, with capacity of 25 million bbl. General has six plants in the South, and Consolidated has three plants in the Midwest. Combined 1958 sales were $59 million.

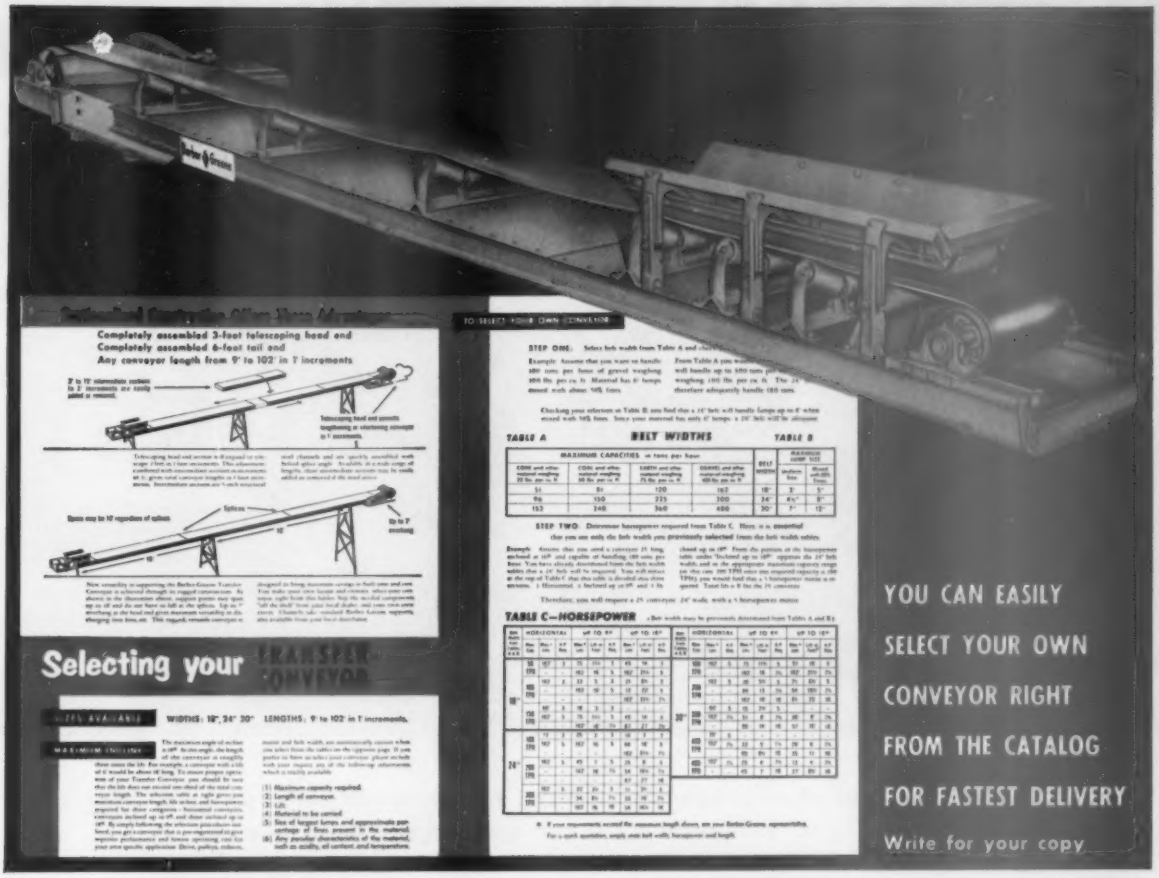
M. J. Grove Lime Co. celebrates centennial

CELEBRATION OF 100 YEARS of operation is going on this year at M. J. Grove Lime Co., Lime Kiln, Md. Starting in 1859, Manasses Grove set up some pot kilns in Frederick County, Va., to supply agricultural lime for his farmer neighbors. Aglime is still a product of the multi-plant firm, but Grove also supplies lime for making steel, for use in the chemical-process industries (including paper and pulp) and others. In 1905 the firm began building roads and bridges, has done so ever since. Grove today has lime plants at Frederick, Md., and Stephens City and Middletown, Va.

NSGA sets 1959 short course for November 16-20

THE 1959 SHORT COURSE of the National Sand and Gravel Association will be given November 16-20 at the University of Maryland. Only one course will be given this year, with attendance limited to 100. Subjects covered are discussed in NSGA Technical Information Letter No. 149, director of engineering Stanton Walker notes. Course content will be very similar to that of the past 13 years.

First three days will be taken up with classroom work and lectures. After that, for those who wish to stay the full week, 20 men will do intensive work in laboratory practice. The others will discuss technical matters, particularly operating problems. Tuition is $50 for the full week and $30 for three days. Registration forms were mailed to members July 1; applications should be mailed before September 15. *(Continued on page 54)*



New, low-cost belt conveyor now available in lengths to 102′

If you handle bulk materials, you should have a copy of the new Barber-Greene Transfer-Conveyor Catalog. With it, you can readily select your own conveyor. Belt width and horsepower are automatically correct for your job.

The Barber-Greene Transfer-Conveyor has cut costs on so many jobs that its range has now been extended to 102′ in 1′ increments. Belt widths are 18″, 24″ and 30″.

Because the Transfer-Conveyor is pre-engineered and made up of standardized components, special engineering time and expense are eliminated, and shipment is from stock—usually from the local distributor's stock. Erection is merely a matter of bolting the major components together and positioning the conveyor. Sectionalized construction gives flexibility for lengthening or shortening to meet future requirements.

Other Transfer-Conveyor advantages include:

Rigidly braced channel frame allows 7′ overhang at head end, 18′ spans between supports.

Head and tail end sections shipped completely assembled, aligned and adjusted.

Heavy-gauge steel decking protects return run of belt.

Worm gear reducer, running in oil, cuts maintenance expense.

Ball-bearing carriers assure long, trouble-free life.

Heavy thread screws provide belt tension adjustment.

Parts interchangeable and repair parts readily available.

58-20-PE

Barber-Greene

AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

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Measure new 34 cu yd International Payscraper advantages

NEW power-to-payload hauling, jam-proof ejection

You can heap up to 34 cu. yd. on a 2-axle International 295 Payscraper (or a 3-axle "495" model). You can operate as fast as 32 mph.—faster, even than smaller rigs of other makes.

You've got industry-topping, power-to-payload wallop in these giant new models. You get the sock of 375 high-torque turbocharged diesel "horses" from International's fuel-thrifty new DT-817 six-cylinder diesel. You get direct, push-button starting; all-altitude high-efficiency performance.

Exclusive bowl "with a flare" loads and keeps bigger heaps!

Exclusive new Payscraper tapered bowl design outcycles "slow loaders," "load spillers," and "reluctant dumpers." Widest of all cutting widths—131 inches—lets scraper wheels and pusher operate inside the cut, the best traction zone. Wide-cutting bowl and center rolling boil-in speeds heap loading. The tapered bowl is a superior heapholder even at the faster haul speeds. Obstruction-free bowl provides fast, positive jam-proof ejection.

Operators become full-time earthmovers!

Minute-stealing operating delays are eliminated, with speed-gaining, balanced design. The 295 Payscraper operator, for example, commands ample power and traction to pull out of 90° turns—even on soft fills—without time-losing back-ups.

The operator rides in cushioned comfort in a 16-adjustment seat that smothers bumps. He has reach-easy power brakes, "control tower" vision, flush deck safety. For the first time in big 2-axle scraper history, the operator becomes a confident, full-time, full-capacity dirt-mover!

From power to push-block—from fuel thrift to dirt on the fill—compare new giant-sized International Payscraper models to anything else on wheels. Note how they lead in turbocharged diesel horsepower. Match exclusive tapered-bowl scraper advantages against less-advanced design. Size up strength—ease of control—speed—capacity! See your International Construction Equipment Distributor!

International® Construction Equipment

International Harvester Co., 180 North Michigan Avenue

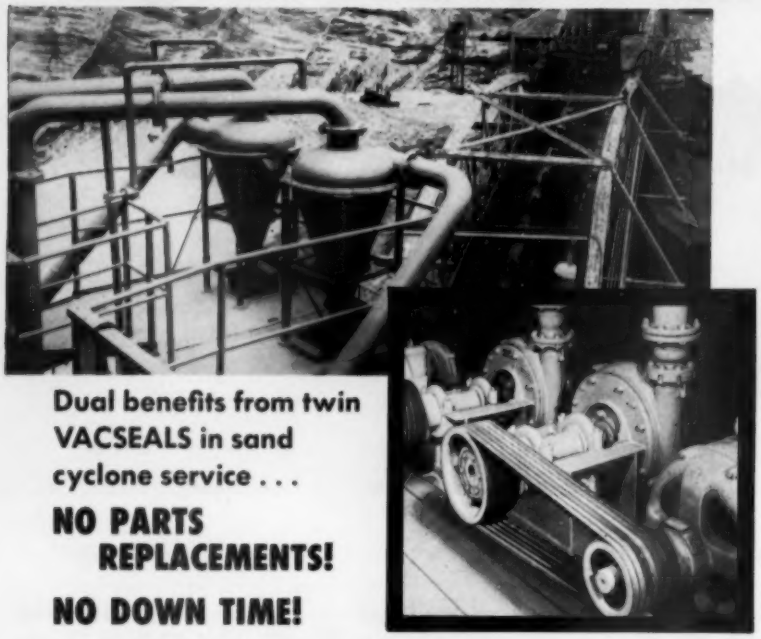
A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom-Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

wallop....NEW speed loading, . NEW full-power 90° turning

Three "295's" of a 6-unit Payscraper fleet, building new superhighway near Beloit, Wisconsin. Both the "295" and "495" feature International's fast-acting, finger-tip controlled model 280 cable control unit—built to give you high capacity; simple adjustments; low upkeep! Positive, forced ejection, plus gaping 98" apron opening, assures fast, positive dumping of all materials. Even gummy, barrel-sized blue clay chunks are quickly ejected—as this "495" view proves, on an operation of V. H & M Construction Co., Denham Springs, Louisiana.

VACSEAL PUMPS

. . . on fifth year of endurance run at Chandler Palos Verdes Sand & Gravel



Dual benefits from twin VACSEALS in sand cyclone service . . .

NO PARTS REPLACEMENTS!

NO DOWN TIME!

Two durable, 4", rubber-lined VACSEAL sand pumps on the job 10 to 12 hours a day, 6 days a week for over 4 years . . . pumping 50% solids, 700 gpm @ 50'TDH. That's the amazing performance story reported by John Robertson, Supt. for Chandler Palos Verdes Sand and Gravel Products. Mr. Robertson estimates that the durable VACSEAL saves the company over $400 a year per pump on replacement parts alone, plus the added service that comes from a virtually maintenance-free operation. An additional 6" x 8" VACSEAL pump employed at the plant has given equally good performance pumping 30% solids at 75' head over a long distance to another cyclone tower.

Write for free VACSEAL PUMP bulletin. Any special information you may require will be promptly supplied.

VP-521

GALIGHER

CONSULTATION • ORE TESTING • PLANT DESIGN

Leaders in Experience and Service

METALLURGICAL DIVISION . . . ENGINEERING SERVICE

GALIGHER PRODUCTS: AGITAIR® Flotation Machine, VACSEAL Pump, Geary-Jennings Sampler, Acid-proof Sump Pump, Geary Reagent Feeder, Laboratory AGITAIR® Flotation Machine, Laboratory Pressure Filter, Laboratory Ball Mill, Rubber Lined and Covered Products, Plastic Fabrication.

The GALIGHER Co.

HOME OFFICE: 545-585 W 8th South, P. O. Box 209, Salt Lake City 10, Utah
EASTERN OFFICE: 921 Bergen Ave. (Room 922), Jersey City 6, New Jersey

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(Continued from page 50)

Housing continues strong; highways boom persists

HIGHWAY SPENDING THROUGH MAY continued to lead 1958 figures by a healthy margin, government figures show. Highway spending, for instance, was 22 percent higher than for the first five months last year. At the present rate, highway spending will total well above $6 billion this year, compared with the $5.3 billion total for last year.

However, the May increases over figures for earlier months this year are less than seasonal, the departments of Commerce and Labor report. To illustrate, here are seasonally adjusted annual figures for highway building for this year: March, $6.7 billion; April, $6.0 billion; May, $5.9 billion. The same is true for housing, where the 1959 figures for these months, in billions, are: March, $21.7; April, $21.6; May, $21.4. The 1958 total was $17.9.

That the housing outlook is still very bright was affirmed by a National Association of Home Builders survey. Taken early in May, it showed that the builders surveyed plan to increase their total housing starts by 42 percent over last year. It also indicated that two-thirds of their 1959 production is covered by firm commitments to purchase. This is an excellent showing for a period such as the present, when funds are tightening, NAHB reports.

The long-range housing picture also is rosy, most forecasters believe. For the late 1960s, most housing estimates run at 1.5 to 2.0 billion homes a year, because of the high marriage rate expected. The "baby boom" of the 1940s is the cause, the experts report. In recent years about 1.2 million homes per year have been built.

Figures on building of new factories and schools are particularly encouraging, F. W. Dodge Corp. states. April contracts let for manufacturing plants were up 46 percent from the same 1958 month, and school contracts were up 15 percent. The two types of building had been lagging, reports chief Dodge economist George Cline Smith.

The government estimated capital spending, including spending for new industrial buildings, would be up 7 percent this year from 1958, to $32.6 billion. Improved business conditions and higher profits have prompted industry to boost capital spending, economists say. *(Continued on page 56)*

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NOW..clam-action 4-in-1 PLUS values in NEW TD-6 and TD-9 crawlers!

NEW 6-cylinder diesel smoothness and power wallop! Both the new TD-6 and TD-9 Four-in-One's are powered with the millions-of-hours-proven, direct-starting, 6-cylinder International UD-282 diesel. Naturally-aspirated in the TD-6, it produces 55 net engine hp; turbocharged in the TD-9, it delivers 71 net engine hp!

New job-getting efficiency! Both the new TD-6 and TD-9 Four-in-One's have increased track length, for new tough-job stability and flotation. Both are geared with new speeds for greater tough-job capacity. Both have the power-transfer efficiency of new full-face, sintered metal engine clutches.

And both the new TD-6 and TD-9 have exclusive vented track-roller and idler shafts, assuring positive seal protection from over-lubrication. Big 300%-increased lube capacity shells provide 500-hr. track-roller greasing intervals!

Move the selector lever! Prove versatility unlimited of exclusive 4-in-1 as Skid-Shovel; space-saving, bottom-dumping clamshell; full-sized bulldozer; inch-close-accurate "carry-type scraper." Add up how many tens of thousands of dollars a new TD-6 or TD-9 four-in-one can save you, doubling for one limited-duty rig after another! Measure the plus value of exclusive shock-swallowing Hydro-Spring. See your International Drott Distributor for a demonstration!

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL®
DROTT®

New 1⅛ cu. yd. International Drott TD-6 Four-In-One. New TD-9 Four-in-One has 1½ cu. yd. bucket capacity.

WASH WATER goes UP . . .

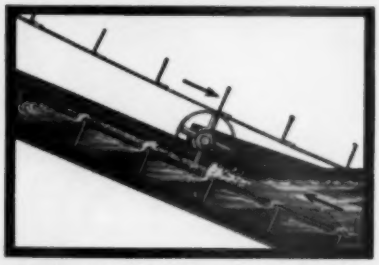
slimes cannot remix with sands . . . in the "OVERDRAIN" Classifier

The "Overdrain" Classifier is a completely new device in the field of mechanical wet classifiers. The belt, with lifting flights attached beneath, moves upwardly out of the sand bed between two stationary side shrouds—creating the effect of a series of moving, closed, washing compartments.

The only outlet from these compartments is via holes in the belt above. Surplus liquid and slimes discharge through these "overdrain" holes without mixing with the oncoming sands. The end result is an extremely clean sand discharge, excellent de-sliming—making the "Overdrain" Classifier an ideal washing device.

Acid-proof construction available.

Write for Hardinge Catalog 39-C-7



Section through "Overdrain" Classifier showing upward-moving, closed, washing compartments.

Unretouched photograph of "Overdrain" action above the belt—water and slimes discharging upwardly.

HARDINGE
COMPANY, INCORPORATED

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INDUSTRY NEWS

(Continued from page 54)

Seaway is magnet for German gypsum producer

THE OPENING of the St. Lawrence Seaway is of great interest to foreign rock products producers as well as to domestic businessmen. One early visitor, in Chicago earlier this year, was Alfons Knauf of Iphofen/Main. He represents Gebrüde Knauf, an integrated gypsum producer in West Germany. Mr. Knauf spent two weeks in Chicago surveying the potential market for the products of his 10 manufacturing plants, and seeking materials for export which would round out his line of construction materials.

Guide published for Canadian industrial minerals

A NEW BOOKLET titled *Prospector's Guide to Industrial Minerals in Canada* is designed to help the prospector decide what industrial minerals to seek, and where. Minerals are listed alphabetically, and descriptions, locations and potential buyers of property or output are included.

Single-copy price of the booklet is $1.00; 10 copies sell for $7.50. The author is G. McL. Hutt, P. Eng., 5127 Notre Dame de Grace Ave., Montreal, Que., Canada.

Phosphate firms try land reclamation

VIRGINIA-CAROLINA CHEMICAL CORP., Richmond, Va., is trying something new in reclamation of mineral lands. It is planting orange trees in its worked-out lands in Florida's Polk County. The project is the firm's response to the evident displeasure of area residents to the large areas covered with spoil material. After a plot of land was leveled, at a cost of under $150 an acre, about 600 trees were planted. The experiment is being made just south of Bartow.

(Continued on page 58)

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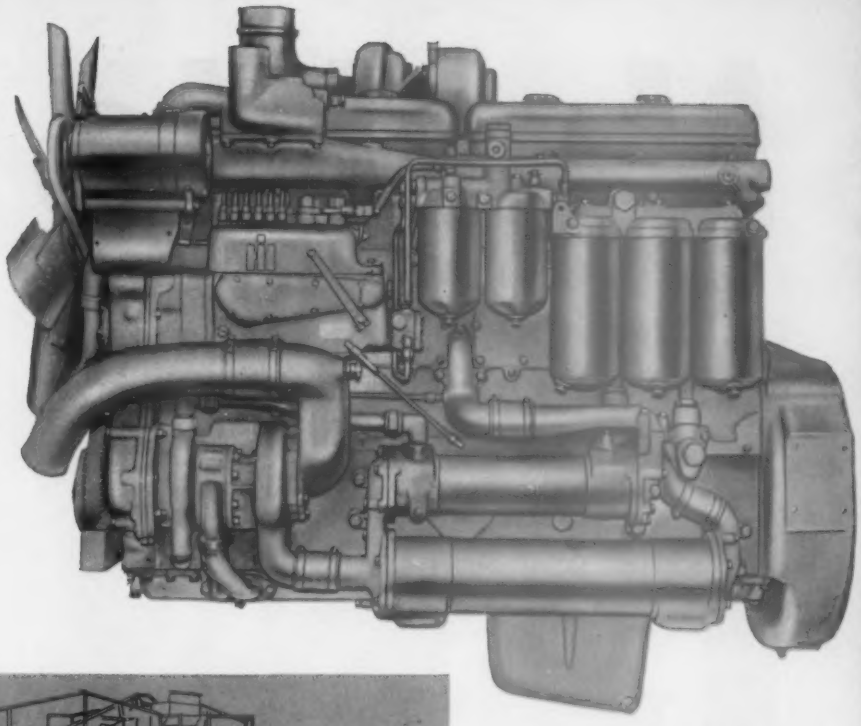
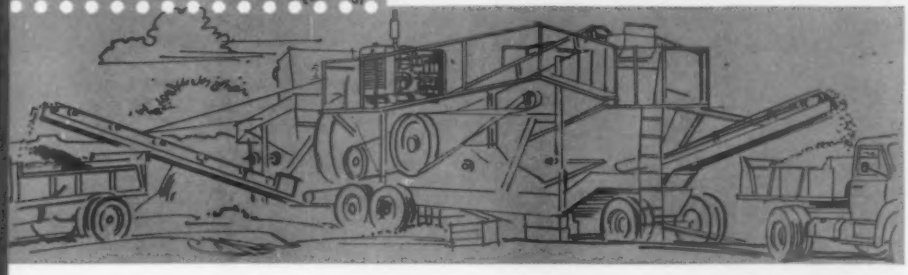




NEW UDT-817 DIESEL is a 4-cycle turbocharged engine with 817 cu. in. displacement and max. torque of 1,040 lbs. ft. @ 1,400 rpm.

New power, performance and price leader in the 385-hp diesel class

Here are three fast facts about the turbocharged new direct-start, direct-injection International 6-cylinder UDT-817 diesel that can mean big savings on your crusher and pump power:

POWER—The UDT-817, developing 385 hp., leads the field in its size class.

PERFORMANCE—The specific fuel consumption of the UDT-817 is the lowest in its size class.

PRICE—The UDT-817 is the lowest priced engine in its size class in dollars per horsepower.

A wide variety of accessory equipment including air cleaners, flywheels for leading makes of torque converters and clutches, torque converter cooler, air control compressors, safety shut-offs, instruments and engine controls can be furnished to meet your installation requirements. Base, radiator, hood and dash, clutch and power take-off are available for complete power units.

The new 250-hp. D-817 is the naturally aspirated version of this same basic diesel engine. Your nearby International Power Unit Distributor or Dealer can give you full details of either new model or on the 30 other diesel and carbureted pit and quarry engines in his line. All 32 engines have one common feature—fastest payback power for users.

International® Construction Equipment

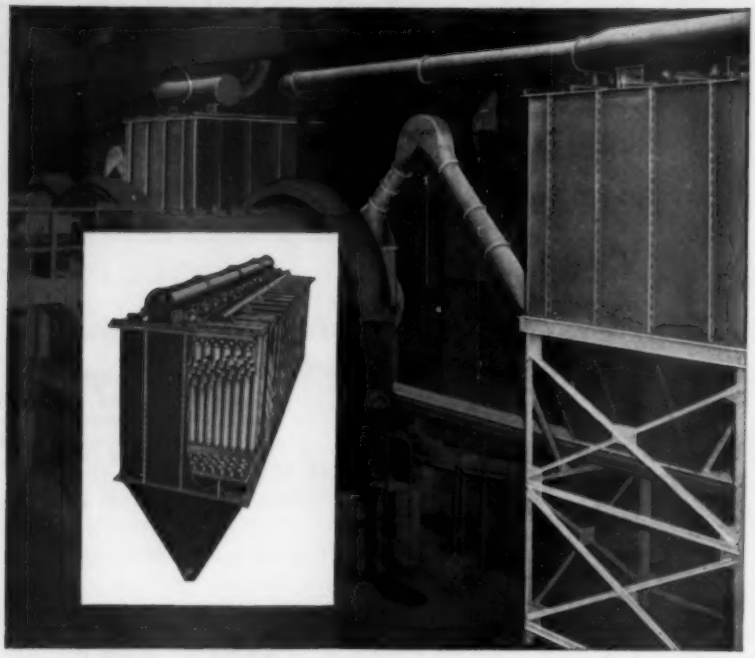
International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill.

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom-Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

Norblo

fully automatic bag-type

Dust Collection Systems



Dependable Heavy Duty Service at Low Cost

Continuous operation at full rated capacity is the performance that Norblo Equipment delivers every day in many types of plants. Norblo's rugged construction, basic unit compartment and few moving parts insure low cost of operation and maintenance. A most important advantage of this equipment is its adjustability for varying dust loading which can be made in a few minutes without shutting down the installation.

Modern industrial "housekeeping" calls for the removal of injurious or "nuisance" air contaminants in the interest of highest efficiency. For certain industries, *recovery* is important also. In large scale operations even small fractions of a per cent better efficiency of fume or dust recovery can mean thousands of dollars a year gained.

Investigate the possibilities of Norblo Dust and Fume Collection for cleaner air, or for recovery of valuable material. Write for Bulletin 164.

The Northern Blower Company

6408 Barberton Ave., Cleveland 2, Ohio • Olympic 1-1300

Norblo ENGINEERED DUST COLLECTION SYSTEMS FOR ALL INDUSTRIES

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INDUSTRY NEWS

(Continued from page 56)

Contractor-aggregate-concrete group adds NCSA

THE JOINT COOPERATIVE COMMITTEE of concrete and aggregate producers, plus The Associated General Contractors, announces that the National Crushed Stone Association has become the fourth member. The two other associations which joined earlier are the National Sand and Gravel Association and National Ready Mixed Concrete Association.

Members are optimistic, AGC reports, about the chances of their cooperative work bringing beneficial results. Common problems the committee will discuss: Promoting the building of highways and other types of construction; Quality standards for concrete and aggregates; Problems resulting from Davis-Bacon and other labor laws; Problems with local zoning and other codes restricting concrete and aggregates operations; and Public relations to develop an understanding of the importance of these materials to construction and to the economy.

Committee members named from the NCSA include Charles Coburn, Waukesha, Wis.; K. K. Kinsey, Cedar Rapids, Iowa; G. D. Lott, Jr., Columbia, S.C.; and W. C. Rose, Malden, Massachusetts.

Members from NSGA and NRMCA are Ralph H. Anderson, Columbus, Ohio; Fred P. Curtis, Omaha, Nebr.; E. K. Davison, Pittsburgh; Herbert G. Jahncke, New Orleans; Robert Mitchell, Los Angeles; John W. Murphy, Spokane, Wash.; John W. Roberts, Richmond, Va.; and F. E. Schouweiler, Fort Wayne, Ind.

Truckers win temporary permits to haul cement

TRUCKERS E. BROOKE MATLACK INC. and M. I. O'Boyle & Son, Inc. have won permission to haul cement from Alpha's Limekiln, Md., plant and Standard Lime & Cement's Martinsburg, W. Va., plant. The permission was granted pending a final Interstate Commerce Commission hearing which will decide on permanent permission.

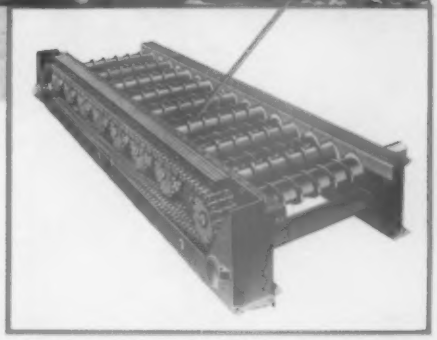
Decision was made by a special three-judge court, which denied the request of Pennsylvania Railroad and Baltimore & Ohio Railroad that permission be denied. The *Wall Street Journal* reports that the two cement firms intervened in the case, stating that they wanted truck service, rather than having rail service only.

(Continued on page 62)

Mr. Joe Wenke, a 25 year veteran in the quarry business, operates a Portable Universal Wobbler Feeder-Impact Master Primary Plant combined with a portable Universal 800 Secondary Plant, in his quarry near Toledo, Iowa

"Our Universal plant handles wet material better than anything we've ever seen"

says Mr. Joe Wenke, veteran quarry operator from Toledo, Iowa



Elliptical-shaped bars form the feeder bed and are set in alternate vertical and horizontal positions. Turning of bars imparts a rocking, tumbling, forward motion to load. Fines drop through bar spacings to under conveyor and by-pass primary crusher.

"We're using Universal's Wobbler Feeder-Impact Master combination ahead of our portable secondary, a Universal 800. We're working in limestone and last year's heavy snows made the material really wet. But that didn't slow down production. Our Universal plant handled this material better than anything we've ever seen.

"Before we installed Universal we were having difficulty in this wet material. Our other impact crusher couldn't clean itself out. The material banked up, the rocks bridged and we had to shoot several times a day to clean it out.

"Universal's Impact Master cleans itself. The whole secret is that the rock goes straight out. We've been able to reduce welding time on the hammers from three hours a night to only four hours a week. We've increased our production, too. The Wobbler Feeder sifts out all 2½" and under material ahead of the crusher. The crusher works only on oversize."

Performance like this comes only from Universal's exclusive design principle: *Controlled impact action*. Raw quarry feed is reduced by impact blows from hammers on two rotors turning in the same direction as the moving material. Rock enters a congestion-free breaking chamber and moves out by straight-line action for fastest possible discharge. Impact blows from the first hammer shatter rock along natural cleavage lines eliminating any basic weakness in the raw material. Subsequent cross-breaking — by hammer impact — produces a highly cubical product. Finished sizes are controlled by speed of rotor hammers and simple adjustments of a stripper bar and lower screen grate.

We'll be glad to tell you what the Wobbler Feeder-Impact Master combination can do for you. Tell us the kind of material to be handled, the percentage of fines to be removed and desired capacity in tons per hour. We'll furnish complete information at no obligation. Write today.

PETTIBONE UNIVERSAL
In Cedar Rapids Since 1906

UNIVERSAL ENGINEERING CORPORATION

617 C Avenue N.W., Cedar Rapids, Iowa

Subsidiary of Pettibone Mulliken Corporation, 4700 W. Division Street, Chicago 51, Illinois

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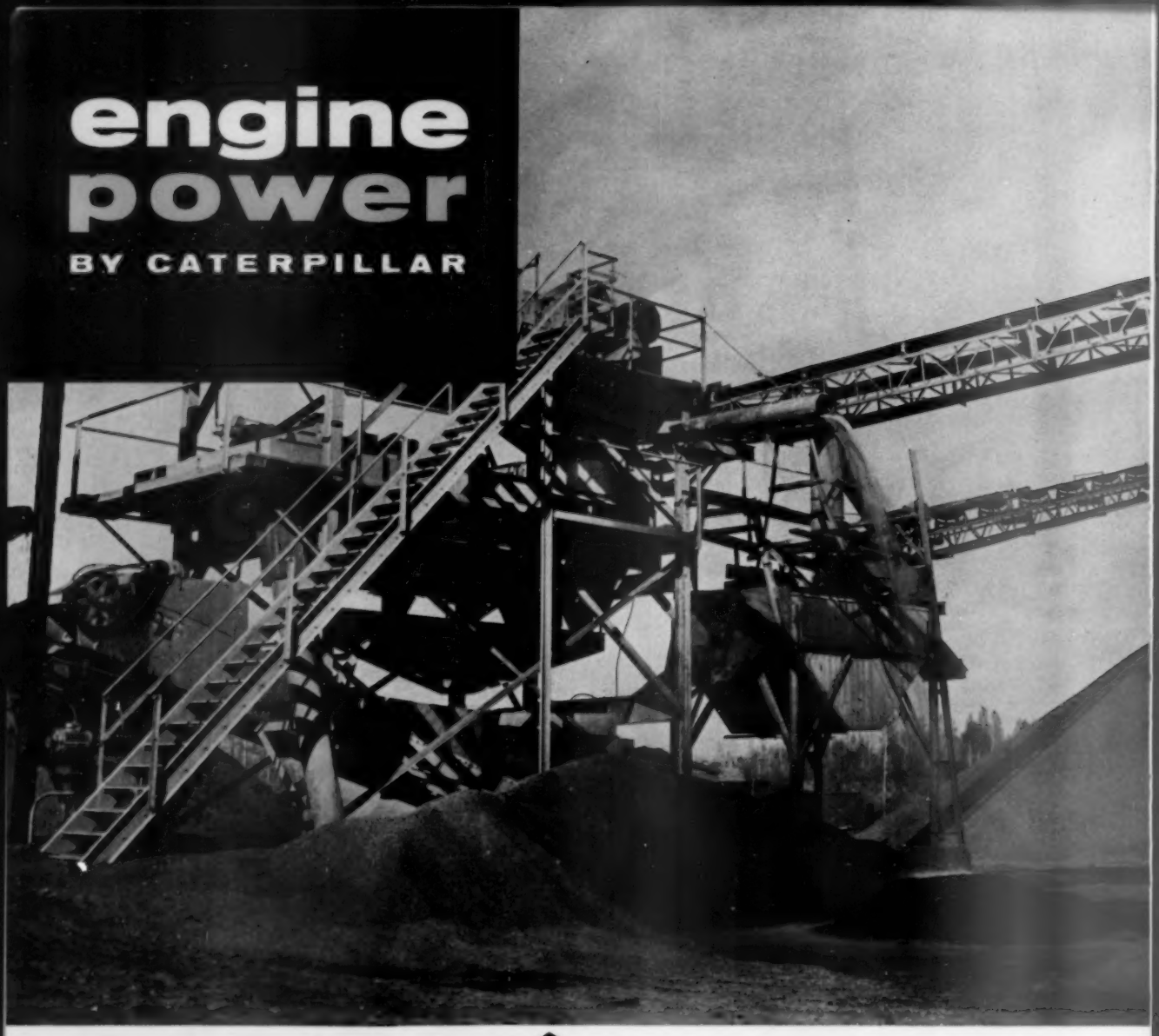
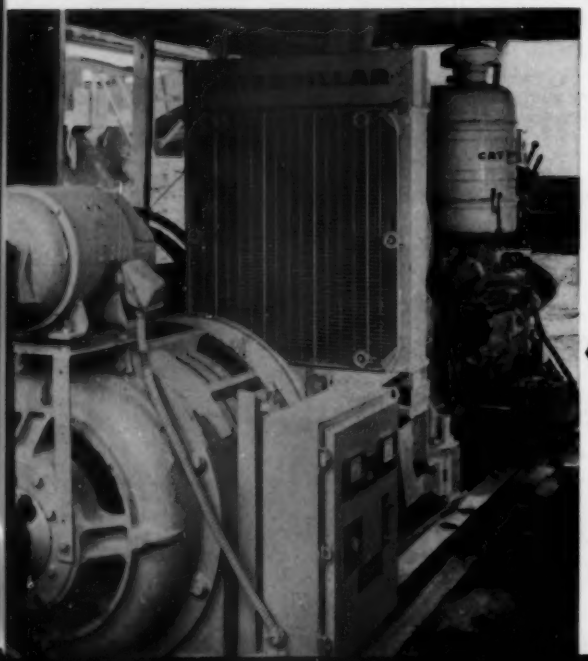
engine power

BY CATERPILLAR

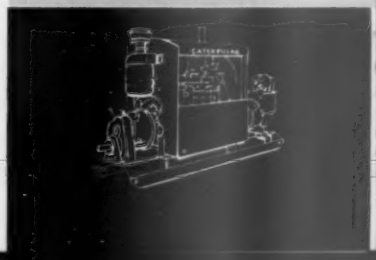




Arrowhead Sand and Gravel replaced three diesels and one gas engine with this Cat D353 "Two-Handed" Diesel with belt pulley drive. The 1-for-4 substitution increased production of washed material from 85-90 yd. per hour to 120-125 yd. per hour. Arrowhead is one of the largest aggregate plants in the Duluth-Arrowhead regions of Minnesota. The Cat "Two-Handed" Engine provides direct power for an 18 x 36 inch Universal jaw crusher, a 24 x 42 inch Pioneer roll crusher, electrical power for ten motors from 1 to 60 HP, including a 60 HP motor on a Cedarapids 100 x 42 inch scalping screen. In addition, this power package supplies current for plant lighting.

This is all the room Arrowhead Sand and Gravel needs for the Cat D353 "Two-Handed" Set. You don't need any elaborate shelter with Caterpillar Engines because air, fuel and lube oil are all filtered to keep microscopic abrasive particles from getting into engine. 100% filter protection is standard—at no extra cost . . . provides longer, trouble-free life, cuts down time.

Nine basic Cat "Two-Handed" Engines range in size from the 650 HP (maximum output rating) D397 to the 75 HP D311 (Series H) . . . are matched with generators to meet your needs.



How one Cat "Two-Handed" Diesel replaced four engines

"When an engine can run the entire plant with direct drive from one end and power a large generator from the other, the engine must have built-in mechanical and engineering superiority."

—Con Robertson, President
Arrowhead Sand and Gravel
Duluth, Minnesota

Four engines were at work on Con Robertson's washing plant near Duluth. Performance and production were limited by lack of power on the primary crushers. The obvious answer was to put a larger engine on this vital jaw and roll combination.

Instead, Arrowhead installed just *one* Cat D353 "Two-Handed" Engine to replace three diesels and a gas engine. Production rose by 40 yards per hour. Efficiency went up when the power source was concentrated in one package.

There are *nine* basic Cat Engines capable of transmitting 100% power off either end of the crankshaft. They can be matched with clutch, transmission and generator to exactly match your plant mechanical-electrical requirements. The transmission or clutch can drive jaw and drum crushers through simple, direct connections. Electrical power from the generator can allow better control of screens and belts for an even flow of material.

Cat "Two-Handed" units are compact and portable. You can mount them easily on trucks away from dust and vibration. Their fast governor response makes them a natural for crusher jobs.

You can save money by taking power off both ends of a single crankshaft. Call your Caterpillar Dealer today to receive the advantages of a Cat "Two-Handed" Engine installation on your job.

Engine Division, Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

For further information send for booklet, "Now for Top Crusher Production"

Cat Crankshafts are made from pre-tested steel drop-forgings, with journal surfaces "Hi-Electro" hardened to *last*. Rifle-drilled crankshafts carry oil under pressure from journals to crank pins and bearings.

Your Caterpillar Dealer Engine Specialist is your diesel power consultant. He's backed by quality parts, reasonably priced, and a skilled staff of factory-trained servicemen. Call him now to avoid problems later.

Caterpillar's own foundry casts engine blocks of a special high-tensile strength alloy, 50% stronger than ordinary gray iron castings. Further rigidity and strength are provided by numerous ribs and partitions.

CDES

FOR DEPENDABILITY
PLUS ECONOMY
REPLACE WITH
INDIAN BRAND

Get the most out of your present equipment. When you need replacements, remember we started in 1913 to build our reputation in the Manganese Steel field for dependability plus economy.

Insist on
INDIAN BRAND
MANGANESE STEEL

Shovel Dippers • Dipper Teeth
Shovel Treads
Crusher Jaw Plates
Mantles • Concaves
Bowl Liners • Roll Shells
Pulverizer Hammers
Grate Bars • Breaker Plates
Ball Mill Liners • Screen Plates
Misc. Manganese Steel Castings

THE FROG, SWITCH AND
MANUFACTURING COMPANY
Carlisle, Pennsylvania • Established 1881

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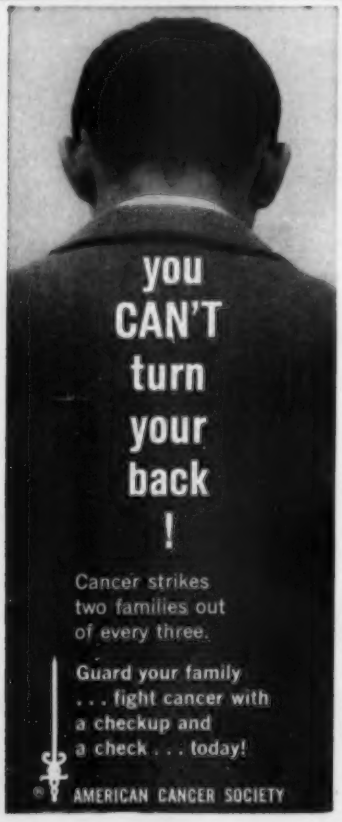

INDUSTRY NEWS

(Continued from page 58)

Public relations news

NEW YORK TRAP ROCK CORP. has established the New York Trap Rock Corp. Foundation, Inc., through which it will contribute to religious, scientific, educational and other charitable groups in its marketing area. The firm contributes, through the Foundation, amounts equal to those given by employes to certified colleges, universities or schools. It also grants to the school districts in which it pays school taxes, an additional sum each year for improving non-tax supported educational items.

Several Minneapolis-area rock products producers are among the 50 contributing, along with labor, to build a half-million-dollar camp and rehabilitation center for underprivileged and near-delinquent children near the Minnesota city. Operated by The Volunteers of America, the camp was built with $160,000 worth of supplies and equipment given or sold at low prices, and with 50,000 man-hours of time.

Calendar of Coming Conventions

1959

September 10-12, 1959
Empire State Sand, Gravel & Ready Mix Association, Fall Conference, Otesaga Hotel, Cooperstown, N.Y.

September 14-17, 1959
American Mining Congress, Convention, Metal Mining & Industrial Minerals, Denver, Colo.

September 23-26, 1959
Society of Mining Engineers/American Institute of Mechanical Engineers, Joint Meeting of Coal & Industrial Divs., Bedford Springs Hotel, Bedford Springs, Pa.

September 27-30, 1959
National Sand & Gravel Association, Semi-Annual Meeting, Board of Directors, Lake Placid Club, Lake Placid, N.Y.

October 1-3, 1959
National Lime Association, Operators Meeting, Sheraton Hotel, Phila., Pa.

October 8-10, 1959
Exploratory Drilling Symposium, Pennsylvania State University, University Park (College Park), Pennsylvania

October 11-16, 1959
American Society for Testing Materials, Third Pacific Area National Meeting, Sheraton Palace Hotel, San Francisco, Calif.

October 29-30, 1959
National Slag Association, Annual Meeting, Boca Raton Hotel, Boca Raton, Florida

1960

January 18-21, 1960
American Road Builders Association, Annual Convention, Netherland Hilton Hotel, Cincinnati, Ohio

January 24-28, 1960
Associated Equipment Distributors, Annual Meeting, Conrad Hilton Hotel, Chicago

February 15-19, 1960
National Sand & Gravel Association, Convention & Exposition, Conrad Hilton Hotel & Coliseum, Chicago, Illinois

February 22-24, 1960
National Crushed Stone Association, Annual Convention & Exposition, Conrad Hilton Hotel, Chicago

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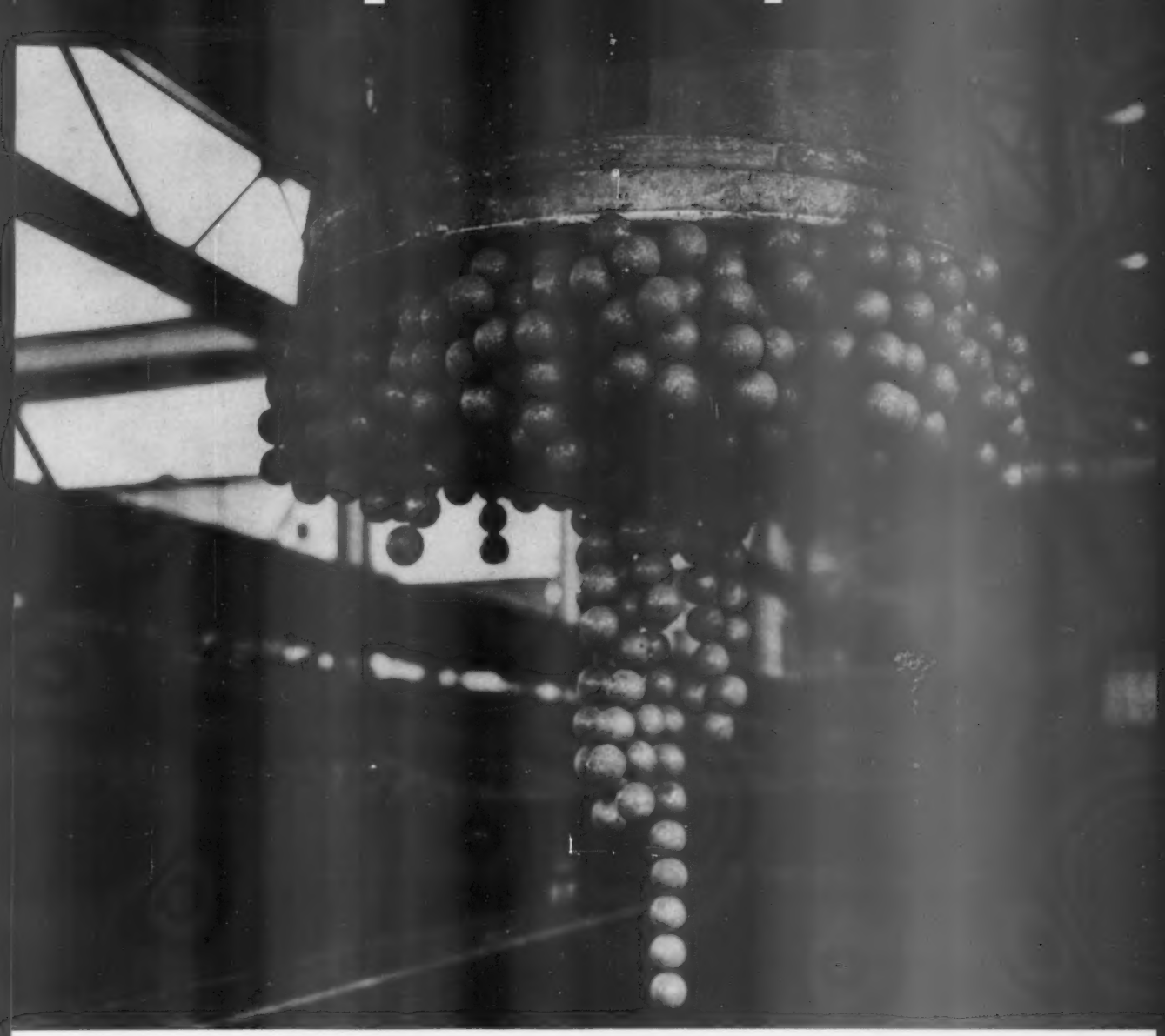

Need grinding balls in a hurry?

CONTACT UNITED STATES STEEL! If all of a sudden you find you're caught short on grinding balls, you can get them fast from United States Steel. For example, a plant in Indiana recently phoned our Indianapolis sales office and asked if we could deliver 20,000 pounds each of 1¼- and 2-inch diameter USS Carbon-Manganese Grinding Balls to them *in two days!*

We did. The grinding balls were packed in drums, shipped via truck, and arrived at the Indiana plant on the morning of the day they needed them.

Though most companies place orders for grinding balls two to three months in advance, there are always emergencies . . . and United States Steel is ready to help you when that emergency develops. A complete stock of USS Carbon-Manganese Steel and USS Alloy Steel Grinding Balls is maintained at all times.

We can ship grinding balls almost any way you like: In 100-pound capacity burlap bags; in 2,000-pound capacity steel drums; in semi-trailer or dump trucks; in gondola or box cars (loose or in containers); or you can send your own truck if you like. The next time you need grinding balls contact the United States Steel sales office nearest you, or write or call United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS is a registered trademark

USS

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Export Company

United States Steel

HINTS AND HELPS

Profit-making ideas developed by operating men

Rubber sandwich for jaw crusher relieves pressure dangers

AN AUSTRALIAN DIORITE producer found that the expansion of the manganese steel breaker plate on his primary jaw crusher would destroy the copper shim and stress the casting to the breaking point.

A rubber sandwich of 80 Durometer rubber between mild steel plates was inserted between the wedge block and the breaker plate. As the jaw plate metal creeps, the rubber strips compress, relieving the pressure.

Improved strap allows greater safety for common steel drum

THE UNIVERSALLY AVAILABLE 50-gal. steel drum has become one of the most commonly used containers in this country. Because it is relatively cheap to buy, rugged and durable, and painless to discard, the steel drum is widely used in the rock products industries.

But the very simplicity of construction makes it a major safety hazard for those not skilled in handling these drums. The drum has no hand hold, no flanges or handles. It takes an adept and careful man to fit a chain or wire rope sling to a well-filled drum.

The maintenance department of a western cement mill fully realized the dangers of handling these useful containers. Rather than depend upon the skill of a hookman to make a secure sling, a crane attachment was designed especially to handle barrels. This is a steel strap, pivoted in a clevis. The strap fits below the corrugated reinforcing of the drum and the strap is held together with a bolt. The pivoted clevis permits the drum to be tilted to empty its contents—something which could not be done easily with a chain sling.

Tool rack cover

WHEN THE TOOL RACK is convenient for the shop workers, it is often just as handy for others who pass by. A Texas producer devised a way of cutting the loss of tools by building a protective cover for his tool rack.

A steel frame was covered with hardware cloth and fitted into angle grooves attached to the tool rack. A counterweighted sash cord makes it easy to raise the frame. A hasp and lock completes the assembly. The maintenance foreman has the key, and checks out tools to other departments that need them. Very few tools "disappear" anymore.

Harry Hess
Houston 4, Texas

Stop water-hammer

WATER-HAMMER can be especially destructive in long pipe lines, especially where there are many miles of large-diameter pipes. A southern operator solved the problem of destructive water-hammer, or air-hammer for that matter, by installing release valves at regular intervals along his pipe line. By putting in butterfly valves with lever arms for counterweights just ahead of his centrifugal pumps or sharp bends he was able to protect his equipment from damage.

The lever arms permit the addition or removal of weight to suit volume.

(Continued on page 66)

Fewer replacements, farther between

...with these LINK-BELT conveyor and elevator chains

LINK-BELT C CLASS CHAIN combines cast malleable center links with steel sidebars connected by steel pins. Broad tops and bottoms provide ample sliding surfaces for drag conveyors. Also available with Promal or "file-hard" Promal center links for extreme loads and abrasive wear. Promal is the special Link-Belt metal that lasts much longer . . . costs but little more.

LINK-BELT SS CLASS BUSHED CHAIN. If your conveyor or elevator must be lengthened, or load increase accommodated, you can install this all steel chain in place of C Class *without changing sprockets!* It offers hardened joint bearing surfaces for greater wear resistance in heavy-duty conveying and elevating. Smooth, tough joint surfaces repel gritty materials, prevent packing, and resist abrasion.

Full information on these chains . . . plus a broad line of attachments and sprockets—is contained in Catalog 1050. Get your copy by writing direct . . . or call your nearest Link-Belt office or authorized stock-carrying distributor, listed under CHAINS in the yellow pages of your Phone Directory.

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CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15,008

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HINTS AND HELPS

(Continued from page 64)

Boulder flipper

OUT IN THE WILD, wide open spaces of the far West everything is bigger than anywhere else in the country. Apparently, this even goes for the gravel.

When a sand and gravel processor became overwhelmed with 2-ft. gravel, he installed a huge inclined grizzly above the feeder supplying his primary crusher. However, the incline was not quite steep enough to keep the heavy boulders moving across the grill.

The answer to the problem was to hinge the lower end of the grizzly and to work out a leverage system to tilt the whole assembly. When the heavy gravel accumulates on the steel grid, a small motor slowly elevates it until the gravel boulders roll off. The empty grizzly is lowered into place and the trucks resume dumping.

Rail safety

A SOUTHERN CEMENT PLANT had a number of close calls when rail crews moved empty cars with employes still working inside. This hazard was overcome by making a number of triangular steel signs, painted bright blue and mounted on small pedestals.

These little signs have come to be recognized by train crews as a signal that someone is working in or around the rail car on the siding.

Pipe rack

WHEN YOU DON'T often carry pipe on a pickup truck, this portable rack made by a Kansas producer may prove useful. It is made by bolting a 2½-in. pipe across the truck behind the cab. The pipe has holes drilled about every 3 in. for a machine bolt, and with a triangular brace welded to the end.

A removable section of 2-in. pipe is fitted to slide into the larger pipe, and drilled holes match the holes drilled in the larger pipe. A bar at the end will hold pipe or tubing in place.

When long pieces of pipe are handled, another support is placed across the front fenders and the pipe lashed in place. If a heavy load is handled, another assembly on the other side will balance the weight.

Harry Hess
Houston 4, Texas

Door safety

DO YOU HAVE an industrial building with doors that open out directly into a truck road? Many rock products producers do, and do not realize the potential hazard. There is danger, not only from someone stepping out of a door right into the path of a truck or car, but from a truck clipping the open door or from obstructing it by parking right there.

Several safety-minded producers have discovered that a simple guard rail will keep traffic at a distance. In this way a door can be full open, yet protect the person who opened it. Sometimes concrete curbs are just as effective, but they have the disadvantage of not being high enough.

Pound wise—penny foolish

AN EXECUTIVE of our acquaintance makes it his business to personally supervise the selection of capital equipment. To him, first cost is no object as long as he gets the very best machine for his money. He can spend thousands of dollars without batting an eye.

But when this big work is done, he turns his "small" purchasing over to someone else with only the instructions, "Be careful."

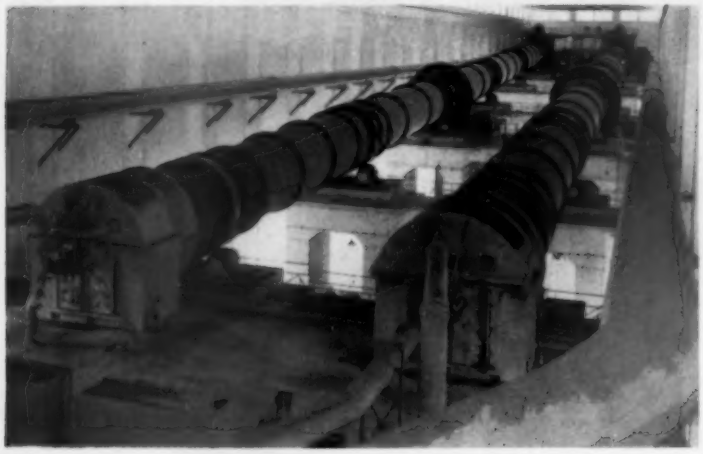
Very frequently this care means that only the very cheapest materials are purchased. Gasoline, oil, fuel, tires, bearings, belting, hose and other accessories are bought at the lowest price available. Very often his carefully selected machine is serviced with second rate parts and lubricants.

When this happens, "A penny saved, a penny earned" no longer applies. The difference between the least costly and the most expensive maintenance item is merely an insurance premium against premature failure of an expensive production tool. A few hours' loss of production will frequently equal months or even years' supplies of first grade accessories.

W. F. Schaphorst
Newark, N. J.

END

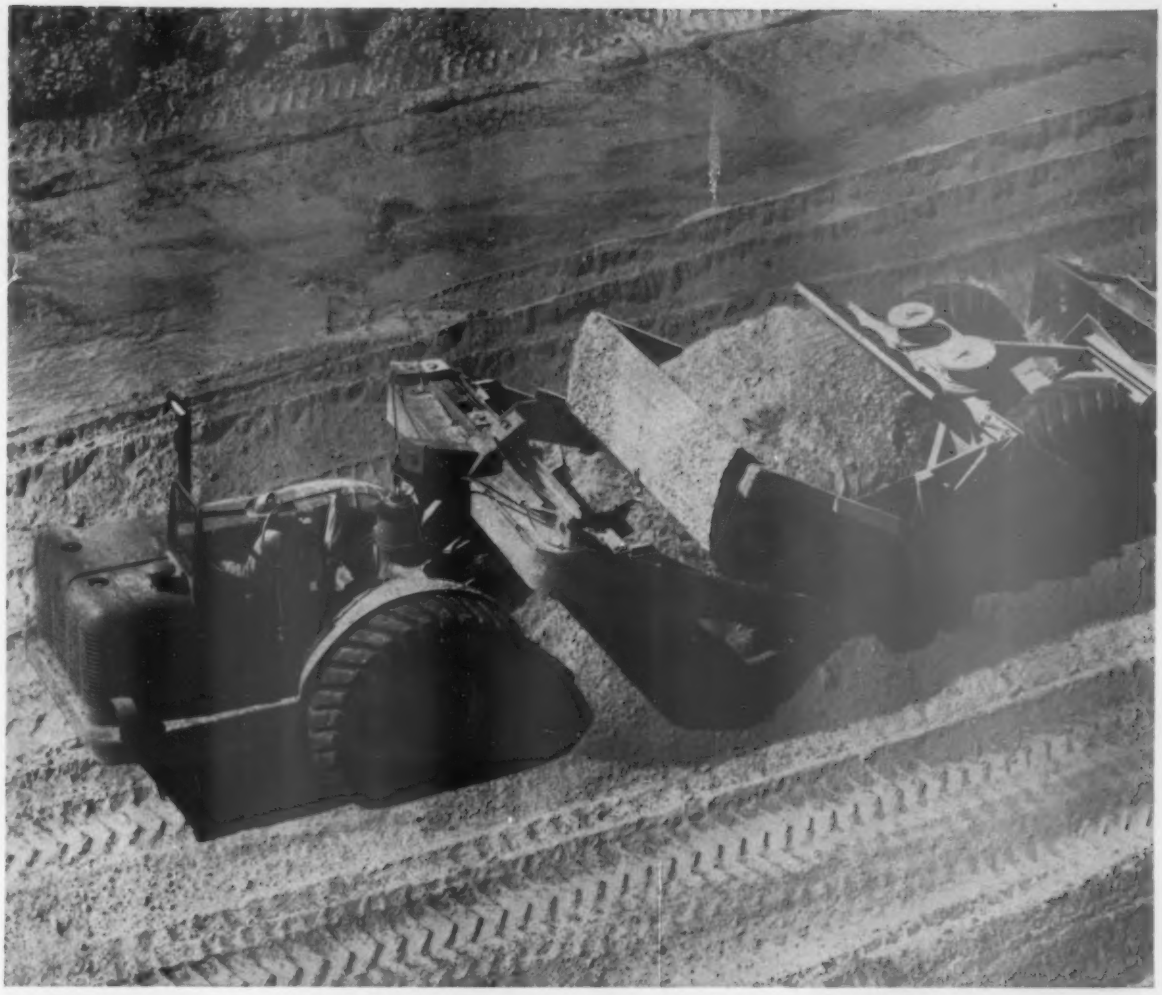
Efficient exhaust handling protects electrostatic equipment



CONVENTIONAL DESIGN of exhaust air handling equipment around cement kilns involves a large, efficient electrostatic dust collector and a tall stack. This equipment is needed to handle the tremendous volume of hot air, dust and fume at the exhaust end of the kiln. A much smaller volume of dust laden hot air is generated when air is passed through a clinker cooler at the discharge end of the kiln. Normally, this air is drawn through a small bank of mechanical dust collectors and put into the atmosphere through a short stack.

This volume of air is so small in relation to the exhaust gases from the kilns that most cement producers seldom give it a second thought. But one southern cement maker felt that even a little clinker dust was too much. With a major investment in electrostatic equipment, *all* exhaust air should go through it.

It wasn't easy to do. After cooler air is put through dust collectors to strip out usable clinker dust, the hot air is pumped back to the feed end of the kilns in large ducts. There it is introduced to the electrostatic precipitator, and all process air is discharged to the outside scrupulously clean.



JOB RECORDS PROVE

Firestones move more payloads per tire!

Firestone off-the-highway tires lower earthmoving costs by cutting downtime and staying on the job longer! Every Firestone tire is built with Firestone Rubber-X, the longest wearing rubber ever used in Firestone tires. Tough Firestone treads and sidewalls defy cuts in rubble and shale. And Firestone S/F (Shock-Fortified) nylon cord bodies withstand bruising shock and impact to deliver maximum tire life! Count on Firestone off-the-highway tires for new low costs-per-hour! See your Firestone Dealer or Store and ask about the full line of tubeless or tubed off-the-highway tires and Firestone on-the-job service.

Rock Grip Excavator Wide Base Rock Grip Excavator

When ordering new equipment always specify Firestone tires—available tubeless or tubed.

Firestone

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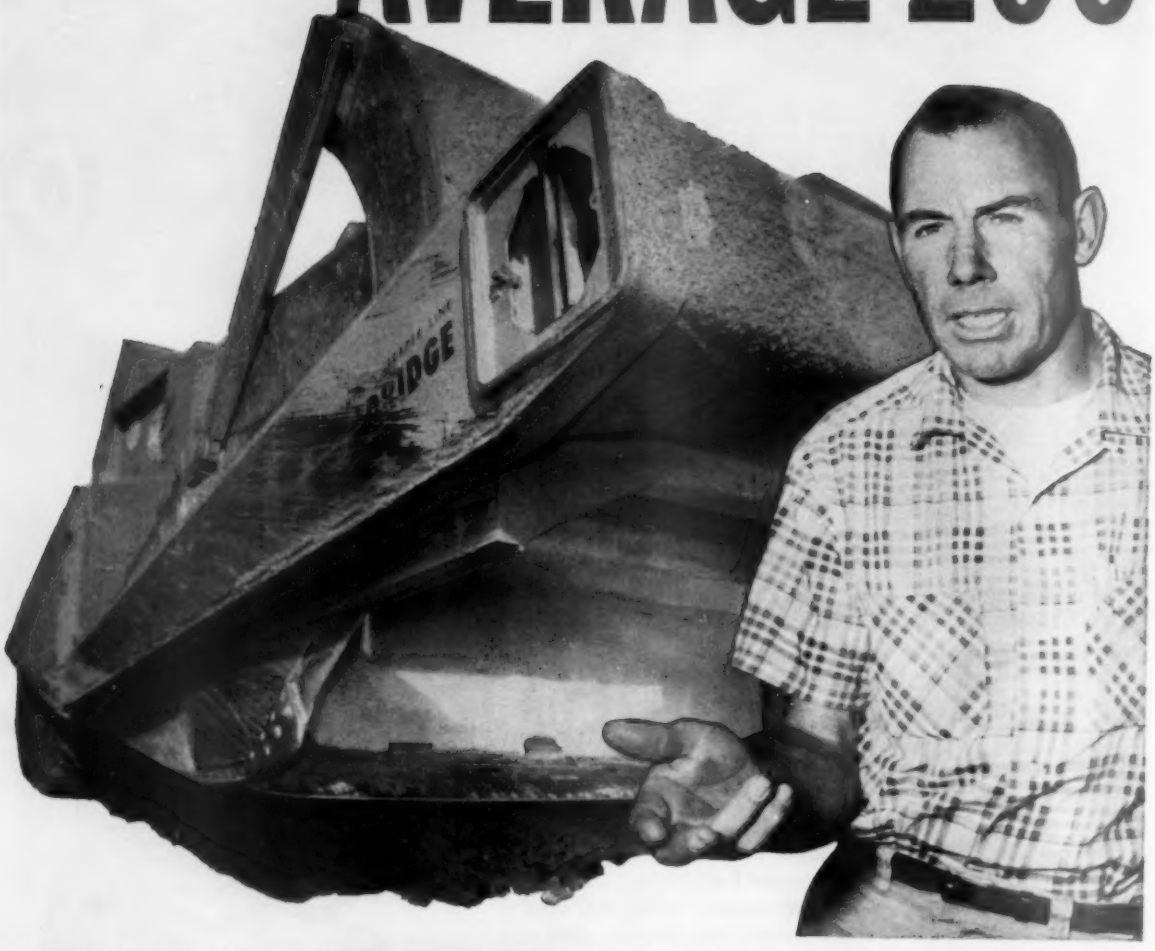
ESCO CUTTING EDGES AVERAGE 200



RICHARD CHAFIN, project engineer of Madonna Construction Company, uses *ESCO* cutting edges to keep maintenance costs low.

HOURS OF SERVICE
...on each side!

The Madonna Construction Company switched to *ESCO* cutting edges after on-the-job tests that "represented every known strata in southern California." Richard Chafin, project engineer, relied on *ESCO* bits to move 200,000 yards of sandy gravel, studded with 36-inch donickers... and in doing so compiled maintenance figures that showed *ESCO* bits averaging 200 hours before reversing.

Cutting edge longevity is only half the story. Bits that last longer mean less down time, lower charges against machinery idled through frequent bit changes. *ESCO* cutting edges, Chafin found, maintained the 150 cubic yard-per-hour rate that he considers essential if earth moving is to pay.

What *ESCO* products did for this project engineer, they can do for you. Put *ESCO's* durability to work for you. Use *ESCO* cutting edges —they'll save you time, when time is money.

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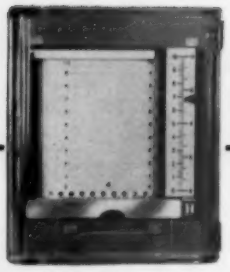
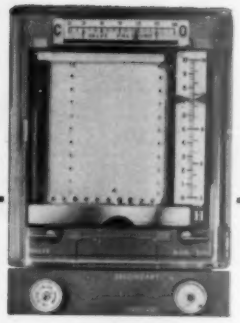
Exhaust fan and tempering air damper position, cooler exhaust temperature, feeder position and similar variables are precisely indicated on *Tel-O-Set* circular scale indicators. Readable to 0.5% of full scale.



Kiln speed, product temperature, coal mill temperature and cooler bed temperature, as well as other variables, are recorded and indicated by *Tel-O-Set* single and multiple point recorders.

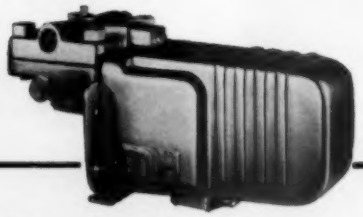


Fuel-air ratio is maintained at point of maximum efficiency by *Tel-O-Set* controller which resets combustion air from fuel requirements and O_2 analysis at the stack.

Remote measurements of temperatures, draft, and other variables are transmitted to the recorder or controller by the *ElectroniK* Electro-Pneumatic Transmitter. Eliminates time lag and need for tubing compensation.

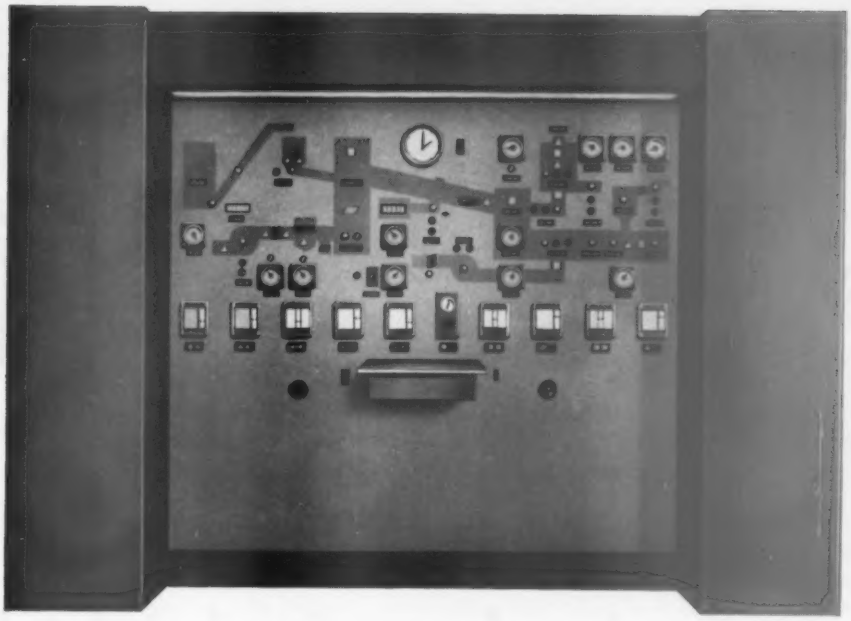
From burner

Kiln draft, tempering air, and air to mill dampers are all regulated by this Honeywell valve operator with integral positioner. Also used for cooler, grate speed and draft regulation.



Differential Converter used to measure flows throughout the entire process. Measures directly and transmits pneumatically to the recording and/or controlling instruments on the central control panel.

Product temperature of cement clinker, lime, etc., is detected by *Radiamatic* pyrometers connected to *ElectroniK* instruments . . . which in turn can initiate automatic fuel control.



Graphic instrument panel, with miniature recorders and indicators, makes it easy to control the entire kiln operation from one central point.

to stack

Honeywell instruments keep kilns, calciners, and dryers at top efficiency

High quality . . . uniformity of product . . . low operating costs . . . these are the results when Honeywell instrumentation is used on kilns, calciners, and associated equipment. These instruments measure and control variables from one end of the kiln to the other—temperature, flow, draft, speed and fuel-air ratio.

Honeywell engineers are well qualified to work with producers and equipment manufacturers to develop complete control systems, using these and related instruments and accessories. Custom-designed panels focus the supervision of your kiln operation in a single, integrated control center. For a discussion of your specific requirements, call your local Honeywell field engineer . . . he's as near as your phone.

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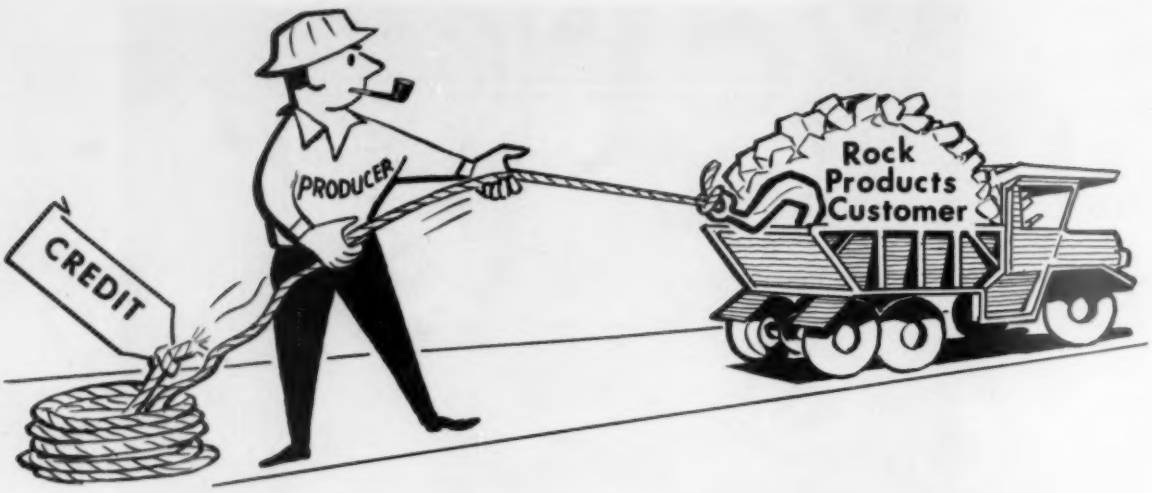


What to do about bad debt losses

by Joseph N. Bell

ROCK PRODUCTS OPERATORS all over the nation are extending credit intelligently and using it effectively. This was the major finding in a survey of credit practices in the rock industries made among a broad cross-section of industry producers by ROCK PRODUCTS.

Within this pattern of generally good credit practices, it was apparent that there is a wide variation in what individual producers consider serious bad debt losses—and how they go about preventing and collecting them.

In this picture, the role of credit organizations seems to be growing and collection agencies lessening. There is also a tendency to deal more and more with large customers on a credit basis; but with small customers, strictly C.O.D. — because credit risk increases sharply as the size of the customer decreases.

These are a few of the general conclusions drawn from the ROCK PRODUCTS credit survey. More specifically, here is how rock producers feel about particular credit problems in the industry:

About 35 percent of the producers surveyed consider credit and collections a serious problem in their business. Yet, strangely enough, only 4 percent considered their bad debt losses too high and 9 percent called them "average." All the rest—including a considerable number who consider credit a serious problem—labeled their bad debt losses "low."

There was also a considerable discrepancy in what various producers considered serious losses. One producer with losses of .8 of 1 percent considered his losses high, while another with almost 2 percent considered his low. The highest bad debt loss reported in the survey (as a percent of gross) was 3 percent; the lowest was one doughty producer who reported "none." The average bad debt loss of all those reporting was .0047 or slightly less than ½ of 1 percent.

This corresponded fairly closely to what the producers considered a "reasonable loss ratio." The lowest suggested here was 1/100 of 1 percent, and the highest, 5 percent. The average of what all respondents considered a "reasonable ratio" was .8 of 1 percent.

Much of the reason for what, over-all, is an excellent credit record in the rock industries is due to good credit information made available to the individual producers. More than 70 percent said they shared credit information with other rock products producers. But less than half (about 42 percent) have their own credit department.

A number of methods of checking credit were mentioned by the survey respondents, but two turned up much more often than the rest. Dun and

"Eight commandments" of good credit procedure turned up repeatedly in a recent survey of credit practices in the rock industries—particularly among those companies with a good collection record

Bradstreet and local banks were the two credit sources turned to most frequently by the rock producers. Next in line was the checking of credit references requested from potential customers. The only other source of credit information mentioned with any frequency was the use of a local or regional credit bureau. About 40 percent reported that they did not belong to any sort of credit organization. Of the remaining 60 percent, about half belonged to a local credit bureau, while the other half was divided equally between regional and national credit associations.

Most of those who belonged to credit organizations were enthusiastic about the services offered. Several typical comments on this point included:

"Last year we became a member of a state credit association which we feel to be worthwhile. We give interchange credit information daily to the Association; once a month we receive a copy of 60-day or more delinquent accounts compiled from lists of such accounts sent in by members. Our membership allows us to order 50 credit reports annually. Since joining the Association, we have not had a bad debt but feel that is due both to the organization and to more careful credit checking on our part."

"As a member of the Building Material Dealers Credit Association, we exchange payment history and job information with other members. We couldn't extend credit without it—at least not with our present staff."

"We find that if we follow the advice of our local Retail Merchants Association before we make a sale or the arrangement of settlement, we have little trouble with credit."

On the collection end, all but a scattered few respondents reported definite collection procedures. However, they varied widely—ranging from "30 days net—we don't wait" to an operator who includes a polite note on his statement if the account hasn't been paid 90 days after it is due.

By far the most popular procedure was to follow up a past due account by letter within 30 days, a second letter in 60 days and a collection agency or personal call within 90 days. However, there were many variations in this pattern. Several producers telephone accounts more than 10 days overdue. A few write a dun letter 15 days after the account is overdue; a larger group prefer to wait 45 days, and some 60 days. One producer charges 6 percent interest on accounts not paid in 30 days; another uses what he called "common sense." Only about 40 percent of the producers use a collection agency, and some of this group pointed out that they do so only as a "last resort" or "if everything else fails." Only about 35 percent reported that local or regional trade associations aided them in the prevention or collection of delinquent accounts.

Nor are cash discounts for fast payment of bills prevalent among rock producers. Only 4 percent reported this as a regular procedure, while about 20 percent do it "occasionally." The remainder offer no cash discounts.

The survey respondents were quite explicit about the groups making up the best credit risks —and the worst.

In the popularity contest for "best credit risk," large contractors were mentioned most frequently, with ready-mix plants running a close second. Others receiving more than passing mention were: industrial accounts, large home builders and government agencies.

On the debit side of the ledger, small contractors were named overwhelmingly as the worst credit risk. This group was singled out three times as frequently as any other. Next came truckers, followed by plumbers and small home builders.

One irrevocable conclusion was obvious: there is a strong parallel relationship between the size of a rock products customer and his credit standing. The bigger they are, the better their credit record. Thus contractors are both the best and worst offenders, the difference being entirely one of size. This indicates rather clearly that all over the country, small operators in the building field are not meeting their bills well or promptly.

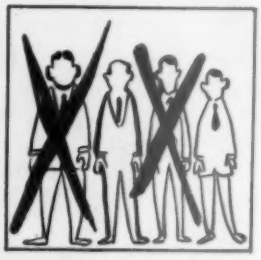
Please turn page

Here are the 8 commandments

Have definite credit policies

Inform your customers clearly and understandably of your credit terms

Get credit information before an order is accepted



Limit your credit; make it selective

Reduce losses

continued from page 73

One rock producer pointed out: "We do not offer credit to local truck business such as farmers and independent truckers. This eliminates a lot of bookwork and losses on small accounts. We have a $5,000 maximum credit limitation on all our customers and we follow up promptly on slow ones—especially on state and federal jobs."

About three-fourths of the respondents reported that they were paid promptly and satisfactorily by the government agencies with which they did business. The remainder said that they were paid eventually but found the collection unnecessarily slow—particularly in the case of local government.

A pattern of good credit practices emerges clearly from the survey answers. All of the producers were asked to name both good and bad business practices which have evolved from their experience in the handling of credit business. Eight points turned up repeatedly—particularly among those companies with a good collection record. Here are the "eight commandments" of good credit procedure as recommended by respondents to the ROCK PRODUCTS credit survey:

1. Have definite credit policies. It's virtually impossible to make out well on credit business without a set of very specific, detailed, and well-nigh inflexible credit policies which are clear to both you and your customers. Credit should never be willy-nilly. If accounts receivable are becoming difficult, then credit policies can be changed to bring them in line. But there should always be definite policy to change.

One producer pointed out: "I feel that the only way to a solid credit program is a set of definite company policies on the aging of accounts—and under no circumstances to deviate from it."

2. Inform your customers clearly and understandably of your credit terms. Much credit trouble stems from misunderstanding. It's important that once you establish a definite set of credit policies, you should then translate them clearly and effectively to your customers. Then there can be no recriminations when you take well-defined steps to collect past due accounts.

"The minute a customer is past due," said a respondent with a fine credit record, "I shut him off until he pays in full. He knows this and I know it; consequently I've never had any problems with this policy. I think my customers realize that I'm simply hitting the account hard in good business fashion."

3. Get credit information before an order is accepted. A corollary to this might be, "Know your customers." Once you deliver to a bad credit risk, it's costly and time-consuming to repair the mistake. This means you should have a credit department, agency, or reference which will give you a quick answer on a potential credit customer.

Many producers solve this problem—as one respondent remarked: "By selling most of my volume to large and reputable customers and avoiding the individuals and questionable accounts which give all the trouble."

Such a policy means passing by good business that could easily be checked out as a credit risk. As long, that is, as it's checked out in advance.

4. Limit your credit and make it selective. There are two positive ways in which you can keep sharp control over credit customers. First, you can be selective—that is, you can refuse credit to customers you consider a bad risk. Secondly, you can limit credit—by permitting credit only up to a certain amount or within a certain period of time.

of good credit procedure

Don't be afraid to say "No"

Don't ship to known deadbeats

Follow up slow-pay customers promptly

Make prompt payment worthwhile to the customer

"We screen all new customers very carefully on their ability to pay," commented one producer. "And we also keep a very close check on old customers to spot any changes in their financial set up."

5. Don't be afraid to say "No." As an independent business operator, you have the right to pick and choose your customers. If you don't like the credit looks of a potential customer, you should have no reluctance to tell him "No." Naturally this attitude should be judicious and applied only where warranted; driving customers away is not a satisfactory method of building business. A credit veto can be used sparingly and still effectively.

Typical of a number of answers was one producer who said: "I'm not afraid to say 'No,' if I'm not fairly sure of getting my money. On a bad account, I not only lose the money but also other accounts I might have served instead."

6. Don't ship to deadbeats. You send good money after bad when you extend further credit to a customer who—because he already owes you money—has demonstrated that he is a poor credit risk.

7. Follow up slow-pay customers promptly. Most survey respondents had a standard procedure for following up slow credit accounts. The follow-up should be prompt and sure. This is simply good business practice and will be accepted as such by most customers.

8. Make prompt payment worthwhile to the customer. This can be done in two ways: by rewarding him if he pays promptly or by penalizing him if he doesn't. A majority of the survey respondents fell in the second category. Interest on past due accounts was mentioned more often than cash discounts for prompt payment. However, one method or the other is a decided stimulant in cutting down on credit problems, because it hits the customer where he feels it the most—right in his pocketbook.

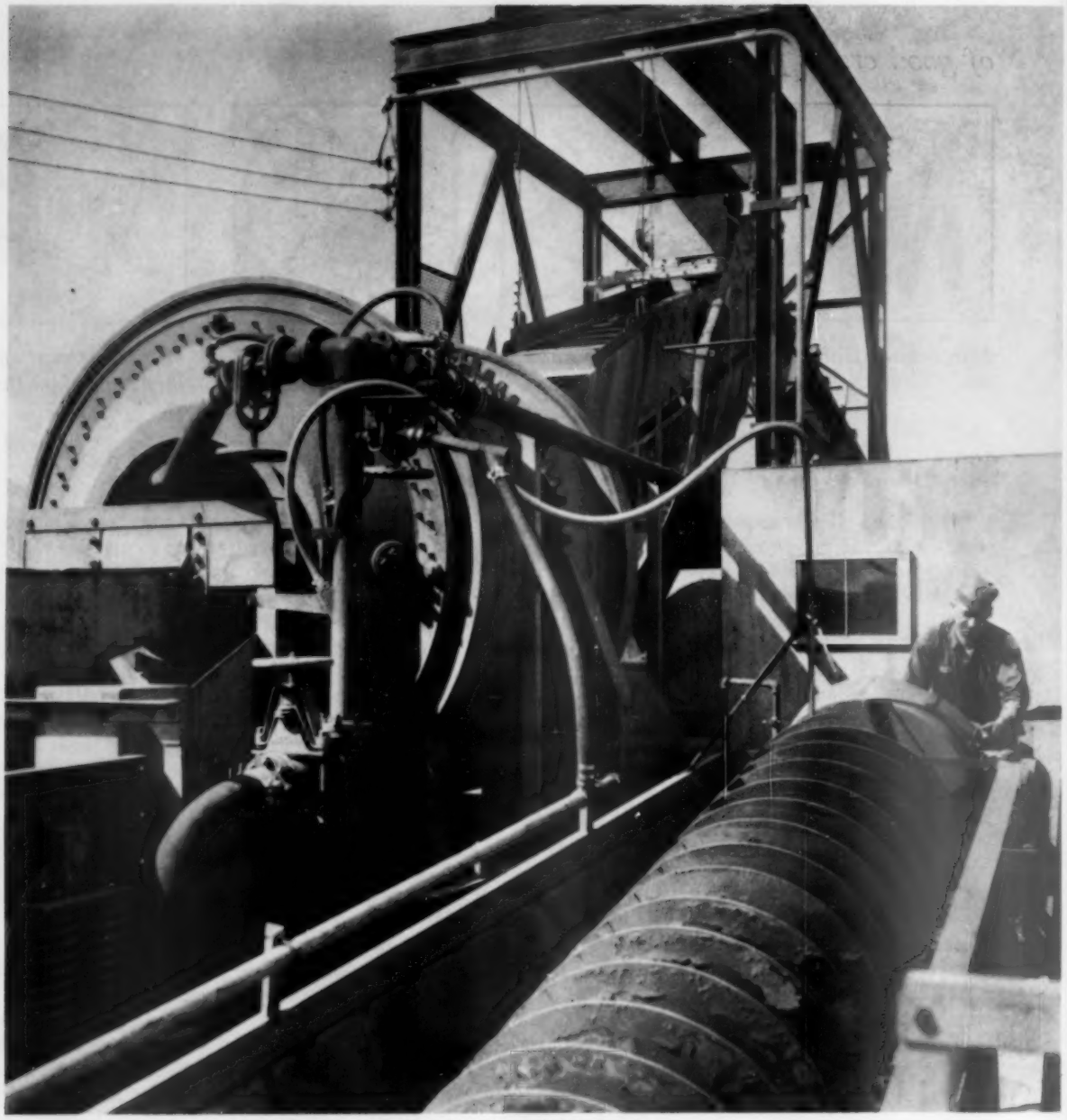
There's a striking similarity between the answers given by the half-dozen companies reporting the best credit record last year. All of them considered their present bad debt losses low and pegged a reasonable ratio at ½ of 1 percent. All of them share credit information, and all belong to some sort of credit organization.

All but one have an employe specially trained in credit problems. Only half employ a collection agency, and they use it infrequently and "only as a last resort." They are rather moderate in their follow-up of delinquent accounts, sending the first reminder from 30 to 45 days after the bill is due. They offer no cash discounts for prompt payment and consider a careful beforehand check of potential customers the best insurance against bad debt losses.

At the other extreme, those encountering the most difficulty with bad debt losses tend to reverse most of the points mentioned on the positive side above. They peg a reasonable loss much higher (up to 3 percent), generally don't share credit information or belong to a credit organization, tend to make extensive use of a collection agency, and make only a cursory advance credit check.

In general, it would appear that rock products operators are doing a better-than-average job in handling their credit problems. We can hope that there is no trend indicated in the comment of one respondent who filled out his questionnaire carefully, then added: "We never experienced any difficulty in collecting our bills until last year. Now, everybody is slow."

Fortunately, this producer was decidedly in the minority. Most returns indicated that credit problems are becoming less—not more—severe. As long as rock operators keep on top of the credit problem as they now appear to be doing, this happy situation will continue. **END**



Key to efficient operation of the media plant is this screw densifier and the magnetic separator with it. They cut costs by recovering for re-use the metallic media from operating water. Operator Earl Blake, shown here, is justly proud of his 100-tph. plant

With their 100-tph. heavy-media plant assuring them of concrete-quality gravel, Nashville Sand & Gravel's owners were able to sell most of this year's production by mid-May

Media-treated gravel wins new markets

by Kneeland A. Godfrey, Jr.

WANT TO IMPROVE THE QUALITY of your gravel to make State highway specification material? Nashville Gravel Co. of Nashville in highway-happy Michigan is doing just that with a 100-tph. heavy media plant.

Back about four years ago, owners F. G. Cheney and G. W. Croppe were discouraged to find that in certain areas their deposit had too much deleterious material to meet state concrete specs. (In most cases, the Michigan state highway department allows a total of between 8 and 10 percent chert, soft particles and hard absorbent particles.)

Clearly something had to be done if they wished to sell high-grade gravel. They decided to buy a heavy media plant, popular in Michigan aggregate plants, to remove most of the deleterious matter. Today most of the 200,000-tpy. plant's gravel production is media-treated. The HMS unit is making it easier to sell concrete gravel, a product bringing a 30 cent per ton price premium. Cost figures mentioned by other producers average around 15 to 20 cents per ton for media plants.

Nearly the entire output for 1959 had been committed by May, much of it to the U. S. Interstate 12 project moving forward a few miles south of the plant's south-central Michigan location. Also, part of the production is trucked to nearby Battle Creek, where the affiliated Modern Transit-Mix Co. operates.

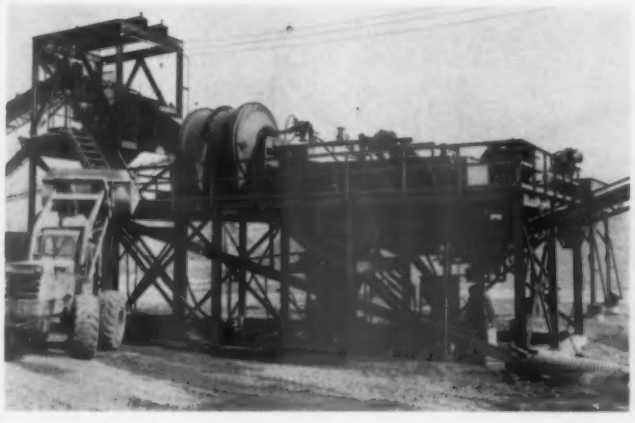
It's a simple unit to operate, agrees media plant operator Earl Blake. Maintenance is simply the usual lubrication and adjustment, and takes but four or five hours a week. And, because the media plant was designed to have slightly higher capacity than the gravel plant which feeds it, this housekeeping is done during the free half-day the media plant has each week. All operator Blake must do, he notes, is watch to prevent equipment damage and backups of material, should any component fail.

Adjusting the flow of media, to get the desired apparent specific gravity, is Mr. Blake's most important job. But even this takes only 20 to 30 min. each morning. Finely ground ferrosilicon is the basic material put in the water in the separator to get the apparent specific gravity desired. But its cost is not inconsiderable—$140 per ton. And Nashville uses a 13-ton charge of media in the plant. So roughly one-third of the charge is made up of a less expensive material, magnetite. This iron compound costs only $40 per ton and brings the unit cost down to an average of $110 per ton for Nashville's media.

Reclaiming the heavy iron media is vital in keeping costs down, Mr. Blake points out. He manages to keep media consumption down to about half a pound per ton of gravel fed to the unit.

The 13-ton charge is reclaimed and recycled continuously by several pieces of equipment. A big 6 x 16-ft. vibrating screen comes first. It has two parallel compartments on its single deck—one for sink gravel, one for the low-grade float. As both products work their way down the long screen simultaneously, a heavy water spray rinses off the media; from here they drop with the water to a sump beneath. V-section bars of stainless steel

Please turn page



Compact heavy media plant has gravel-wash screen at left, then separator drum and horizontal media-rinse screen. Magnetic separator and screw densifier are behind the horizontal screen

Media-treated gravel wins new markets *continued from page 77*

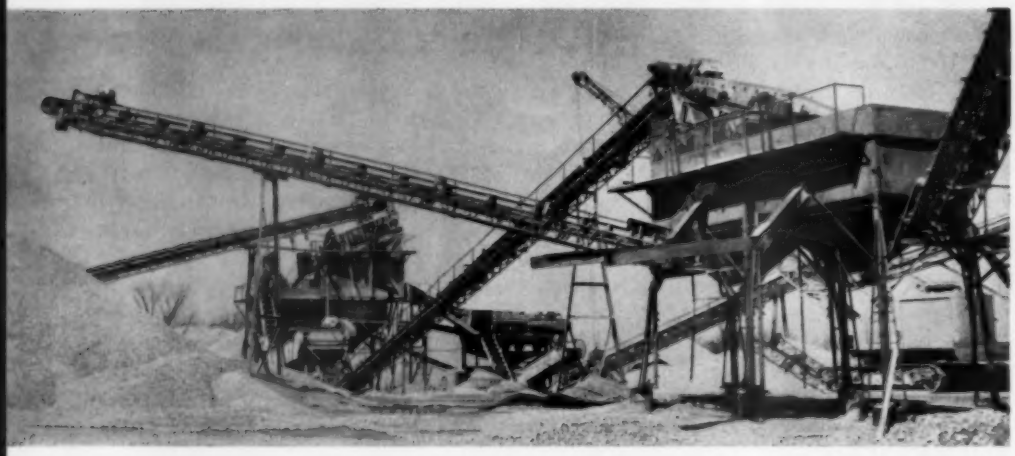
make up the screen surface. Stainless steel is not cheap but is the most economical material to combat the corrosive and abrasive effect of the water-media combination.

From the sump, water and media are pumped up about 12 ft. to the plant's working level once again. Flowing into a metal box, the iron-base particles are pulled from the water by a magnetic separator. Simply a rotating drum equipped with an electromagnet, the separator catches media on its surface. After turning 180 degrees, the media is peeled off by a stationary blade and drops to a single-screw 42-in. washer.

This slow-turning densifier screw thoroughly rids the metallic particles of accumulated slime and, at the same time, dewaters the media charge. Nashville shrewdly chose a 42-in. diam. washer to insure fully adequate capacity. Other HMS plants of the same size, with only 36-in. washers, sometimes find themselves caught with inadequate densifier capacity. From the densifier, a second pump pushes the concentrated metallic medium up to the processing drum.

Key to high labor productivity is a reclaim tunnel under the gravel surge pile which feeds the media plant. Here a pan feeder sends an even flow of gravel to the belt which leads up to the media plant; it eliminates a reclaim dragline or tractor shovel, cutting both labor and equipment costs. And by using a surge pile, Nashville gets treated gravel any time orders come in, whether the gravel crushing plant is operating or not.

Next, the 100 tph. of gravel goes through a



Gravel washing screen, right, receives gravel after it leaves the wash plant at center rear. Surge pile for media is at left

Crushing and screening plant has three stations: crusher and surge hopper, primary screen and secondary crushers, and the washing plant. Pea gravel is stockpiled off to left, sand off to right

twin-deck washing screen, insuring that only clean gravel reaches the media plant. "You've got to have clean gravel in this media plant," operator Blake told ROCK PRODUCTS, "to be sure that clay doesn't plug up the system." Water sprays are directed at both the 1 in. and ⅛-in. screen cloths. Minus ⅛-in. fines are wasted; the two retained fractions now recombine before entering the big revolving drum which makes the separation.

With its supply of ferrosilicon and magnetite carefully regulated, the slow-turning drum works smoothly, floating off low-grade stone from the valuable dense gravel. (For a more detailed description of the heavy media plant with drum-type separator, see ROCK PRODUCTS, May '58, p. 126.)

Tailor your equipment to meet your needs. Nashville plant superintendent Dale Smith has followed this plan to save much in equipment dollars. Take his sand classifier in the main plant, for instance. Occasionally the tank simply couldn't handle the heavy sand load fed to it. With sand accounting for about 50 percent of the plant's feed material, this wasn't surprising. Solution? "Smitty" welded a 4-ft. addition on one end of the tank, and added two discharge valves in the new section, giving a total of seven. Today sand-classifying capacity is adequate, even during peak periods, and the sand leaves the tank noticeably cleaner.

A problem in the pit presents another example of how to tailor equipment to your local situation. Four 6-ton gravity rear dumps and two 10-ton rear dumps handle the pit haulage. Like many producers, Mr. Smith finds that the haulers can do a job even with heavier loads than nominal capacities indicate. Too, with a lengthening pit haul as nearby gravel was eliminated, he needed more haulage capacity. So side boards were added; today heaping loads permit the smaller units to carry 10 tons, the larger rigs, 16 tons.

Here's how the main plant is set up. A 1-cu. yd. shovel in the pit handles the loading chore there. Up at the 120-tph. plant, the rear dumps unload over a 24 x 36-in. jaw crusher. Once through this unit, product drops into a surge bin, a simple yet effective device for evening the flow to the vibrating screen next in line. The surge hopper also takes product recycled from the second-stage jaw and roll crushers.

Next in the process flow is the primary screen, a 4 x 12-ft. double-deck vibrator. Making separations at 2¼ and 1 in., it drops oversize to the two secondaries below—a 10 x 24-in. secondary jaw for oversize and a 24 x 48-in. roll unit for the middle fraction. As noted above, this recrushed product is recycled through a belt and the surge hopper to the primary screen.

Once reduced to minus 1 in., all plant product travels by belt to Nashville's third processing station—the washing plant. Incoming aggregate first meets a 4 x 12-ft. three-deck washing screen atop the wash plant. About 500 gpm. of water, directed through spray nozzles, does the cleaning job on the 120-tph. flow of sand and gravel. Usual cloth sizes are 3/16, ⅜ and ¾ in. Pea gravel is sent from here to a single 24 in. x 10-ft. screw washer and then travels by stacker belt to ground storage.

Sand gets a more elaborate two-step treatment. First it moves to the 22-ft. sand classifying tank, then to a 36 in. x 24-ft. single sand screw. As a final step, a stationary stacker belt stockpiles the sand for later rehandling and loading.

Gravel drops to the other washer, a big 36 in. x 30-ft. double log washer. Next step for the gravel is a ride by belt to a single-deck washing screen; this 3 x 6-ft. unit sizes the gravel, too. Beneath it are two 25-ton load-out bins. The washed gravel is either dropped to the bins or sent (1) to ground storage, by stacker belt, or (2) to ground storage in the surge pile over the reclaim tunnel leading to the heavy media plant. Rehandling chores from the other ground storage piles are carried out by a 2¾-cu. yd. tractor shovel and a 1¾-cu. yd. clamshell crane.

Thanks to a well-maintained heavy media plant and wise use of equipment, Nashville Sand and Gravel can boast of a really efficient medium-size plant.

END

MAJOR EQUIPMENT REFERENCE

In the pit:	
Shovel, 1-cu. yd.	Thew Shovel Co.
Gravity rear-dumps, 6-ton (4)	Koehring Co.
Rear dumps 10-ton (2)	LeTourneau-Westinghouse Co.
In the crushing and washing plant:	
Apron feeder, Jaw crusher, 24 x 36-in., Belt Conveyors	Pioneer Engineering Div., Poor & Company
Conveyor belts, 18 and 24-in.	Goodyear Tire & Rubber Co.
Scalping screen, 4 x 12-ft.	Simplicity Engineering Co.
Secondary jaw crusher, 10 x 24-in.	Pioneer Engineering
Secondary roll crusher, 24 x 48-in.	Austin-Western Works, Baldwin-Lima-Hamilton Corp.
Washing screen, 4 x 12-ft., 3 deck	Simplicity Engineering Co.
Gravel washer, 36 in. x 30-ft. double log, Pea gravel washer, single 24 in. x 10-ft., Sand classifying tank, 20-ft., Sand washer, single 36 in. x 24-ft.	Eagle Iron Works
Gravel washing screen, 1-deck, 3 x 6-ft.	Simplicity Engineering Co.
Rehandling units: tractor shovel, 2¾-cu. yd.	Clark Equipment Co.
Clamshell crane, 1¾-cu. yd.	Koehring Co.
In the heavy media plant:	
Washing screen, 2-deck, 3 x 12-ft.	Simplicity Engineering Co.
Media rinsing screen, 1-deck, 6 x 16-ft.	Allis-Chalmers Mfg. Co.
Magnetic separator	Dings Magnetic Separator Co.
Screw washer-densifier, Heavy media plant and design	Western Machinery Co.

Ball mill and dryer are teamed to make compact, efficient package plant for silica flour

J-M forges ahead in silica

JOHNS-MANVILLE CORP. has assured a never-failing supply of silica flour for its Transite asbestos-cement pipe plant at Stockton, Calif., by tooling it up with its own silica grinding operation.

Operated by the Johns-Manville Products Corp. of California, the Transite plant uses about 20,000 tons of silica flour a year. Specifications require that the finished product be 95 percent minus 200 mesh and 85 percent minus 325 mesh. The feed is minus 30 mesh with 2.7 percent plus 48 mesh and 33.1 percent plus 100 mesh.

The silica plant is a packaged unit, neat, orderly and efficient. Heart of the plant consists of a 70 in. x 45 ft. parallel-flow dryer and a 9 ft. x 60 in. air-swept conical ball mill which operates in closed circuit with a super-fine air classifier. The grinding plant is built in a separate area, away from the main Transite manufacturing section. Finished silica flour is delivered to bins in the pipe plant by a 6-in. pump rated at 25 to 28 tph.

Silica comes from an old gold mining camp at Plymouth, Calif. A large gold milling operation once prospered at the site, to mill a pure white, high-silica, gold-bearing quartz. Several million tons of tailings from this mill are still available.

The material is pumped to a froth flotation plant at Plymouth, where clay and other deleterious materials are removed in float cells. Ahead of the flotation plant, sand is deslimed in a liquid cyclone. Finished sand, a high-grade silica approaching glass sand in purity, is dewatered in rake equipment and trucked to the Stockton grinding plant.

Trucks unload to a hopper that can also serve rail haulage units. A bucket elevator carries the material to a storage bin ahead of the dryer. Damp sand is metered from the bin to the dryer by a 60-in. rotary table feeder admirably suited to this purpose.

Gas is used to fire the dryer, although oil can be burned. The dryer has a capacity of 25 tph. Another bucket elevator takes dried sand to a surge bin over the ball mill.

Ball mill feed is automatically controlled by an electric "ear" which uses sonic vibrations to maintain optimum feed at all times. The ball mill is fed with a belt feeder whose motor speed is controlled from the electric ear.

The ball mill has a capacity of 6 to 7 tph., grinding a minus 8-mesh feed to 95 percent minus 200 mesh. A 300-hp., 800-rpm. motor drives the mill through a double-reduction unit. The mill is loaded with 24 tons of steel balls, 12 tons each of 1½-in. diam. and 1-in. diam. The lining is nickel alloy with chrome wedge lifter bars. The bronze bearings are water lubricated.

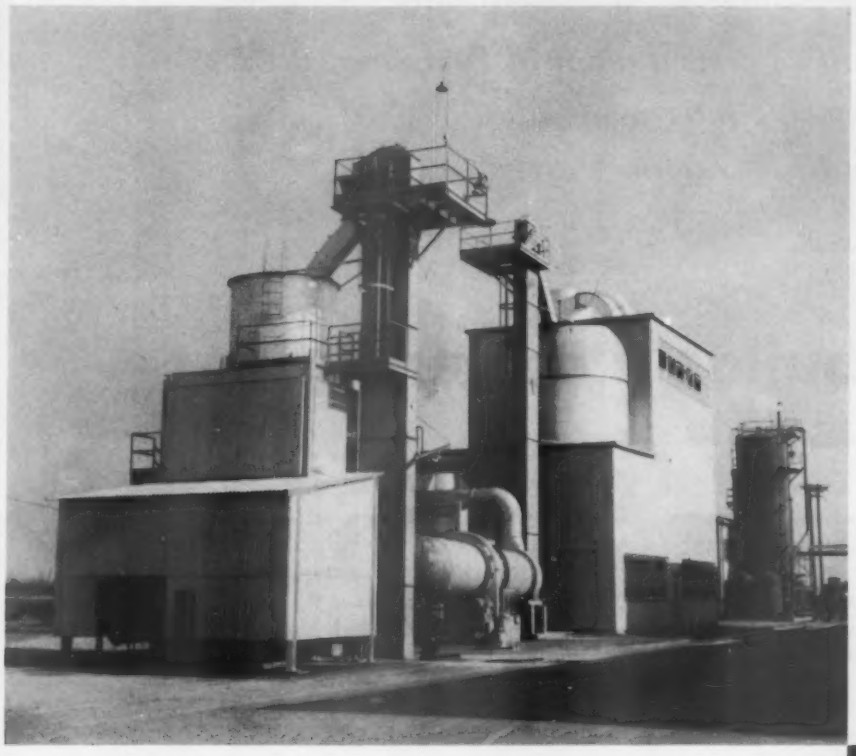
Ball mill product goes to the super-fine air separator, and accepted silica flour is pumped to bins in the pipe plant. Oversize is returned to the mill to be ground again.

Six other silica grinding plants are operated by Johns-Manville Corp. and its affiliates. For many years the parent company purchased the silica flour requirements of its plants which are scattered throughout the United States. But with increasing production, it became economic for J-M to grind its own silica flour.

Other J-M plants are located at Manville, N.J.; Waukegan, Ill.; Denison, Texas; Marrero, La., and Watson and Pittsburg, Calif. The Waukegan, Pittsburg and Watson plants use substantially the same grinding equipment as Stockton. END

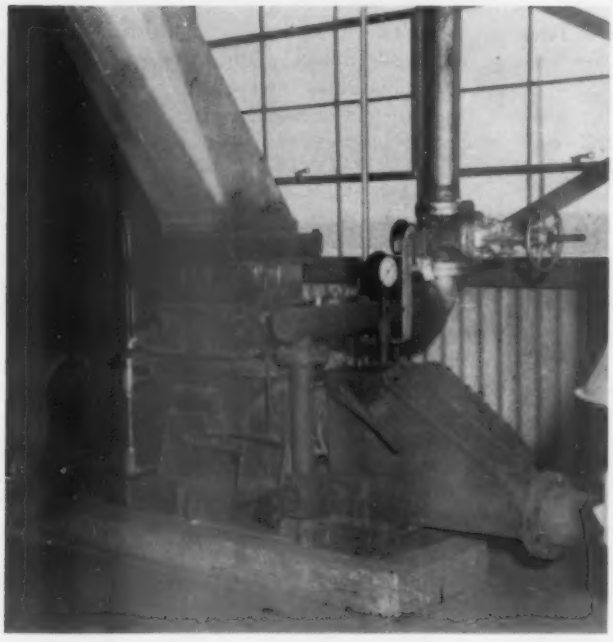
MAJOR EQUIPMENT REFERENCE

Bucket elevators (2)	General Conveyors Corp.
Plate feeder, 60 in.	Hardinge Co., Inc.
Fuel burner	North American Mfg. Co.
Ball mill feed control	Hardinge Co., Inc.
Dryer, 6 x 45-ft. parallel-flow	Hardinge Co., Inc.
Belt feeder	Hardinge Co., Inc.
Ball mill, 9 ft. x 60 in.	Hardinge Co., Inc.
Air separator, No. 90	Hardinge Co., Inc.
Pump, 6 in.	Fuller Co.
Plant design	Johns-Manville Corp.
Construction	H. K. Ferguson & Co.



Left: This general view of silica grinding plant shows parallel-flow dryer (center) which removes moisture from sand before grinding

Below: Silica flour is manufactured by this 9 ft. x 60 in. conical ball mill operating in closed circuit with an air classifier



Finished silica is pumped to storage bins in main plant by this 6-in. pump

Lafarge's new $16-million cement plant in Vancouver, B.C., is laid out to accommodate three more kilns without upsetting the basic pattern

Experience builds a cement plant

by Walter B. Lenhart

ALL THE KNOW-HOW accumulated in 125 years of cement-making went into Lafarge Cement of North America Ltd.'s $16-million wet-process plant near Vancouver, B.C. The plant was built by European and Canadian investors and Lafarge Cement of France, a company that in its long career has supplied cement for both the Suez and Panama canals. The new 1.5 million bbl.-per-year plant is one of the most modern in the world.

A Canadian company took care of future expansion in its plans for the new mill. The one-kiln plant is laid out so that three more kilns can be added without upsetting the basic pattern. The parent firm, Ciments Lafarge S.A., at 32 Avenue de New York, Paris, acted as consulting engineers during the design and construction of the Vancouver plant. Much of the cement making machinery was made in France and shipped to western Canada.

Located on Lulu Island, the new plant is a few miles from downtown Vancouver and close to the busy port of New Westminster. With a dock on the south arm of the Fraser River, facilities for deep-sea, rail and truck shipping are available.

Raw materials are brought to this metropolitan site by barge. The limestone quarry is on Texada Island in the Strait of Georgia. Limestone must be hauled south 80 miles by water to Lulu Island. The clay operation is at Matsqui, about 25 miles up the Fraser river. The limestone and clay deposits have proven reserves for 200 to 250 years of operation. Gypsum is purchased locally and brought in by rail.

The Texada quarry has a face 60 to 70 ft. high and about 600 ft. long. Primary drilling uses a rotary drill, electrically powered and with crawler treads. It drills 6-in. diam. holes on 18-ft. centers and with 18-ft. burden. Holes are charged with alternate layers of dynamite and sand and are fired with millisecond delay caps. A 3-cu. yd. shovel loads the blasted rock into a 22-ton capacity truck.

At the crushing plant, designed to reduce the blasted limestone to minus ¾-in. size, the truck dumps its load into a steel hopper which funnels the material onto an apron feeder. This feeder charges the primary crusher, a 60 x 48-in. jaw crusher with jaws set at 10 in.

The limestone now falls onto another apron feeder which carries it onto a 5 x 12-ft. heavy-duty double-deck screen. The top deck of the screen has 6½-in. openings and the bottom deck 2-in. openings. The limestone is a high-calcium stone, and a considerable tonnage is going to the pulp and paper industry and to the smelting industry in the Northwest. One size of rock for the pulp and paper industry is produced by the heavy-duty screen—plus 6 in.

When the crushing plant is producing only minus ¾-in. limestone, the material coming off both decks is chuted into the secondary crusher. The 5-in. material discharging from this crusher, plus the material that previously went through the double-deck screen, falls to a conveyor belt which carries it up to the tertiary crusher. This crusher, a reversible impactor, is mounted in closed circuit with a ¾-in. screen. All oversize returns to the impactor.

The finished cement rock is carried by a conveyor to a 90-ft. stacker. This unit forms stockpiles of about 15,000 tons of limestone. Under the stockpile are two reclaiming belts, either one of which is able to draw from the stockpile and transfer the material to a swinging boom barge loader. This loader has a swinging radius of 127 ft. and an elevation of 45 ft. The barge is loaded at a rate of 1,000 tph.

Transportation of limestone to Lulu Island is handled by Straits Towing Ltd. A 3,500-ton self-unloading barge built especially for this service is used.

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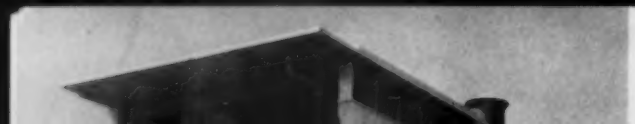
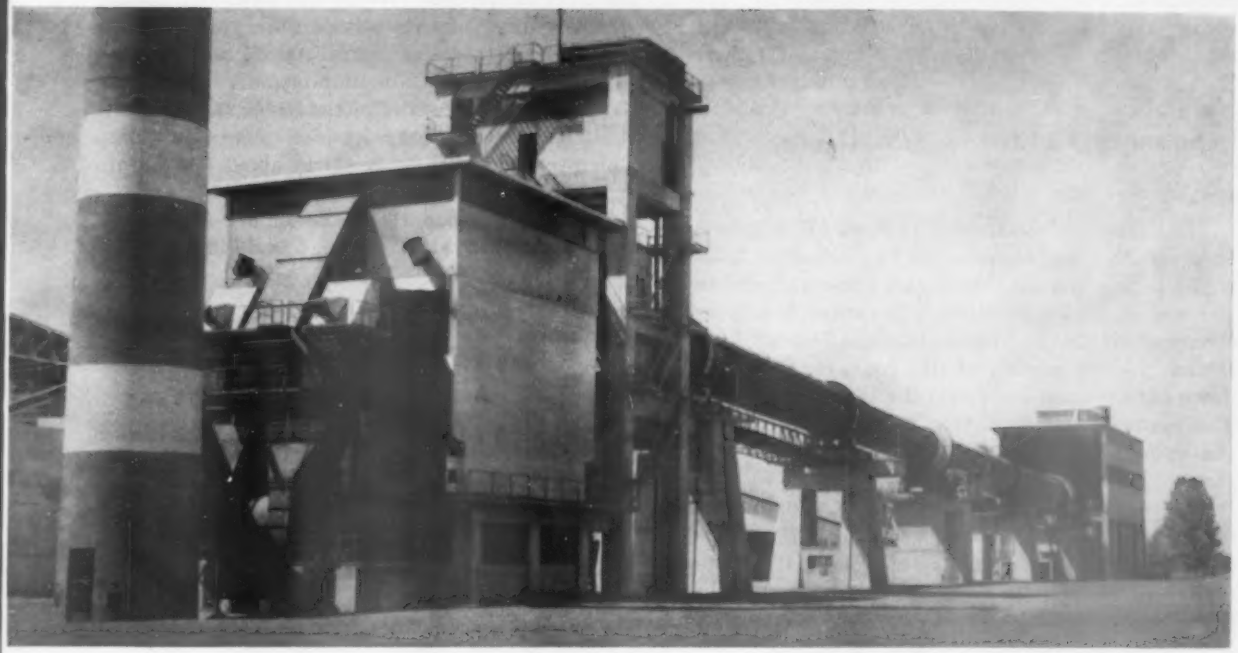


Barge-unloading conveyors start the limestone on its way to the storage hall



Above: The single-kiln operation can be readily expanded to a 4-kiln system

The tanks of the French-designed pneumatic system for conveying finished cement

Firing hood and clinker discharge end of Lafarge's kiln

Experience builds *cont'd. from page 82*

The barge hold consists of two rows of hoppers. Underneath these hoppers are two conveyor belts running fore and aft which carry the material to the bow of the barge where it is chuted to a cross conveyor. When the barge is unloading at Lulu Island, the end portion of this conveyor is hinged down until it extends beyond the side of the barge. The material flows off this belt onto the wharf conveyor system and is conveyed up and into the storage hall.

The cement rock is unloaded at approximately 500 tph. to a Lafarge-designed unloading system. A 36 in. x 400-ft. inclined belt conveyor, in a completely enclosed gallery, conveys and elevates the crushed limestone to the storage "hall." Another belt conveyor runs along a gallery on top of the storage hall and discharges the limestone. Conventional barges or ships can be unloaded with a clamshell, if desired, and 20,000-ton ships can be berthed at the dock.

The clay operation is at Matsqui on the Fraser River. Since the clay is a very sticky material, the plant was designed to make the clay into a slurry that could be pumped.

At the bottom of the clay pit, some 800 ft. back from the river bank, is a scraper tower 75 ft. high. Up the hill at a radius of 800 ft. from the tower are two guyed masts. The haulback block can be positioned at any point between these two masts with a motor-driven remotely controlled winch.

The 4-cu. yd. crescent bucket is dragged down the hillside with a 200-hp. hoist. As it approaches the base of the tower, the scraper bucket is upended and the clay falls into the 27-ft. diam. washmill that adjoins the tower base.

With each load of clay dumped into the washmill, an equal volume of slurry is washed through the screens, over the threshold of the washmill discharge and into a surge tank. From this surge tank an 8-in. pump delivers the slurry to the wharf, a distance of 1,200 ft., where it discharges into the clay barge. The capacity of this quarry operation is 50 to 70 tph. (dry material) or about 100 to 140 tph. of fluid slurry.

The clay slurry is transported to Lulu Island by the Gulf of Georgia Towing Co. Ltd. The towing company uses for this service a barge with a capacity of 1,200 tons of slurry. At the cement plant wharf one end of a 12-in. diam. rubber hose is connected to the side outlet of the barge tank and the other end to the steel inlet pipe of an 8-in. pump which transports the clay slurry about 500 ft. into an 80-ft. diam. slurry storage basin.

Limestone, gypsum and clinker are stored in a large open-ended storage hall. This building is 100

Key to Lafarge Flow Sheet

1—Clay slurry pump unloads special barges from Matsqui at the rate of 150 tph.
2—Self-unloading barge can unload crushed limestone from Texada Island at 500 tph.
3—Enclosed belt conveyor carries incoming limestone
4—Underground pipeline conveys incoming clay slurry
5—Clay slurry storage basin, built of concrete, is 80 ft. in diam. with a capacity of 4,000 tons
6—Storage hall has separate compartments for limestone, gypsum and manufactured clinker, accommodates 43,000 tons of material. A large overhead bridge crane with grab bucket conveys materials into hopper bins
7—Raw ball mill, operated by a 1,400-hp. synchronous motor, grinds clay slurry and limestone into a fine slurry
8—Tanks for blending slurry by means of agitation and compressed air
9—Testing laboratory nested between the blending tanks ensures constant composition of slurries and cement clinker
10—Storage tank has a capacity of 4,000 tons of accurately blended slurry
11—Electrostatic dust collector cleans kiln gases which are then discharged through chimney stack
12—Rotary kiln, fired by oil, is 426 ft. long and 12 ft. in diam. and driven by a 215-hp. variable-speed motor
13—Burner house with firing mechanism and master control panel for the kiln (first floor) and quenching cooler for the clinker (ground floor)
14—Clinker conveyor, over 250 ft., carries clinker to the storage hall
15—Clinker ball mill grinds clinker and gypsum, producing cement
16—Separator takes out coarse particles for regrinding
17—Steel silos for storage of finished cement
18—Packing house, connected to silos by Airslides and bucket elevators, has facilities for sacking cement and loading in bulk or bags into trucks, railroad cars, barges

ft. wide and 297 ft. long. Across the width of the building are two walls which divide the storage hall into three sections holding about 20,000 tons of limestone, 3,000 tons of gypsum and about 20,000 tons of clinker. The stored materials are delivered to the storage hall by belt conveyor.

At one side of the storage hall, adjacent to the grinding mills, are eight built-in proportioning bins. Running the full length of the storage hall is a 12-ton high-speed bridge crane with a 3-cu. yd. clamshell.

The clamshell picks up a load of limestone, gypsum or clinker and drops it into the appropriate bin. There are four hoppers ahead of the raw grind unit so that different types of cement can be manufactured. The storage building was completely prefabricated in France and assembled on the job, and a great deal of its machinery was manufactured in that country.

Raw material processing begins as limestone is metered out of storage. Limestone hoppers have weighing feeders which discharge onto a short conveyor which delivers the limestone directly into the ball mill. At the same time, clay slurry is being pumped into a constant-head tank; an orifice in the outlet of this tank controls its flow into the ball mill. Water is also being fed into the ball mill with flow controlled by a special gate valve with a graduated stem. Sufficient water is added to maintain the slurry at 32 percent moisture. The grind is 90 percent minus 170 mesh.

The three-compartment raw ball mill is 36 ft. long and 9½ ft. in diam. This mill is connected through a gear reducer to a 1,400-hp., 720-rpm. synchronous motor. The mill operates at 18.8 rpm.

A total of 109 tons of media is used to load the grinding mill. The mill's output is 65 tph. Slurry from the ball mill is then pumped into 40-ft. diam. slurry blending basins.

Slurry is blended in four of these 40-ft. diam. basins, each holding 1,300 dry tons. The final blending is controlled by the chemist. The final corrected mixture is pumped into a large storage tank 80 ft. in diam. and 25 ft. deep holding about 9,000 tons. Like the clay slurry, these slurries are con-

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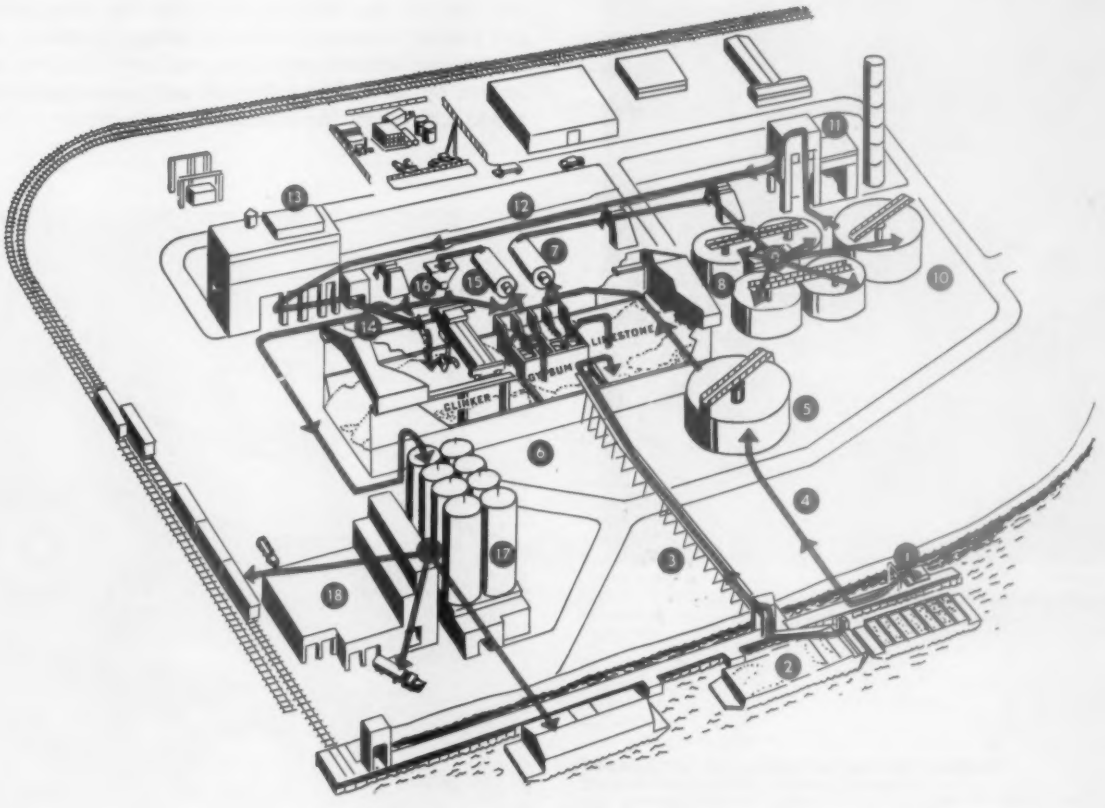


Experience builds a cement plant *continued from page 85*

tinually agitated by mechanical-air slurry mixers to produce a well-blended, homogeneous slurry.

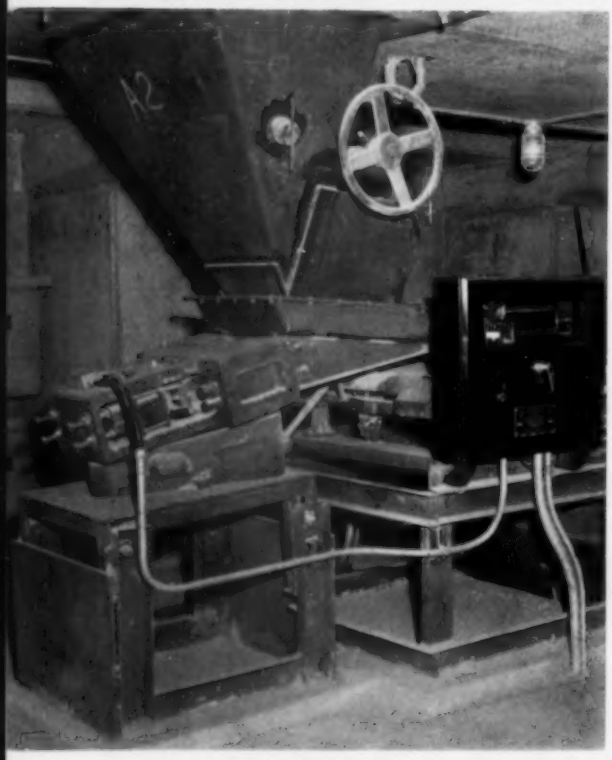
The slurry is drawn from the slurry storage tanks and pumped into the kiln feeding tower, where a Ferris wheel feeder delivers slurry to the kiln feed pipe. The kiln is 12¼ by 426 ft. and is supported by 5 sets of rollers. It revolves at approximately .8 rpm., and is driven by a variable-speed motor with 3-to-1 speed range. This motor drives a reducer and a 4-kva. generator which supplies power to the slurry feeder, keeping a constant ratio between kiln rpm. and amount of slurry entering the kiln.

The kiln is fired by Bunker C fuel oil, but gas or even coal may be used at some future date. The oil is pumped through a ¼-in. atomizing nozzle at 275 deg. F. and at a maximum pressure of 425 psi. The date of fuel consumption will range from 350 to 650 bbl. a day, depending on the rate of clinker production. A 7,000-bbl. tank provides oil storage, and a 200-hp. steam generator provides steam for preheating the oil.

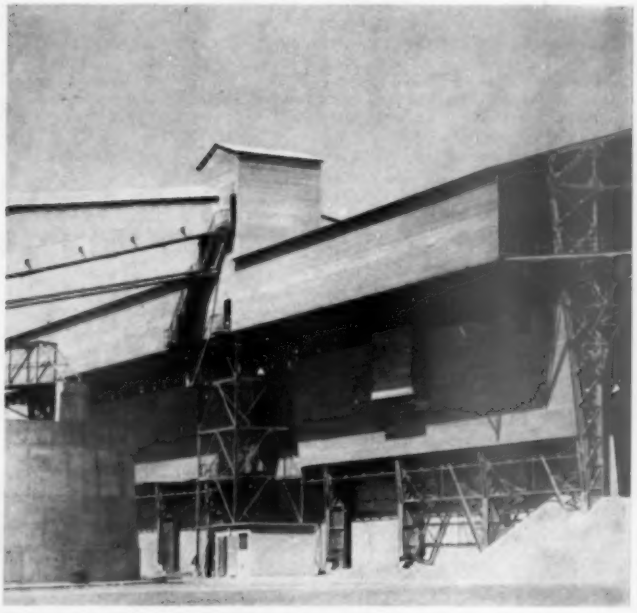
Most of the air from the 7 x 50-ft. inclined grate cooler is sent back up into the kiln as secondary air. Part is exhausted to the atmosphere. A third portion enters a cyclone-type dust collector. Of the air exhausted from the dust collector, part enters the forward cooler fan and is reused for cooling and the remainder is drawn into the primary fan for primary air.

The clinker enters the cooler at 2,500 deg. F. and leaves at 150 deg. F. At the end of the cooler is a hammer mill which crushes any oversize clinker before it falls into the drag chain. The drag chain carries the clinker away from the cooler where it is transferred onto a belt conveyor. This belt carries the clinkers up into the storage hall.

The dust and gases of combustion are drawn from the upper end of the kiln by a large induced draft fan with a capacity of 158,000 cfm. which is driven by a variable-speed motor. Between the kiln and the fan is an electrostatic dust precipitator. Power is supplied to the hanging electrodes by two 80-kv., 400-ma. selenium rectifiers. Dust is returned by air to the kiln feed and goes back into the kiln through the primary air nozzle.



Weighing feeders maintain close control of the rate of flow of clinker and gypsum into the mills



Structural steel storage building was prefabricated in France. It was dismantled and shipped direct to Lulu Island by sea

Finish grinding starts as clinker and gypsum are metered out of their bins by weighing feeders. The materials drop to an 18-in. belt which discharges into the clinker mill. The gypsum comprises four to five percent of the total weight.

The clinker mill is 9½ x 34 ft. with two compartments. The mill works in closed circuit with an air separator. Cement is then pumped through 500 ft. of 6-in. pipe to cement storage silos.

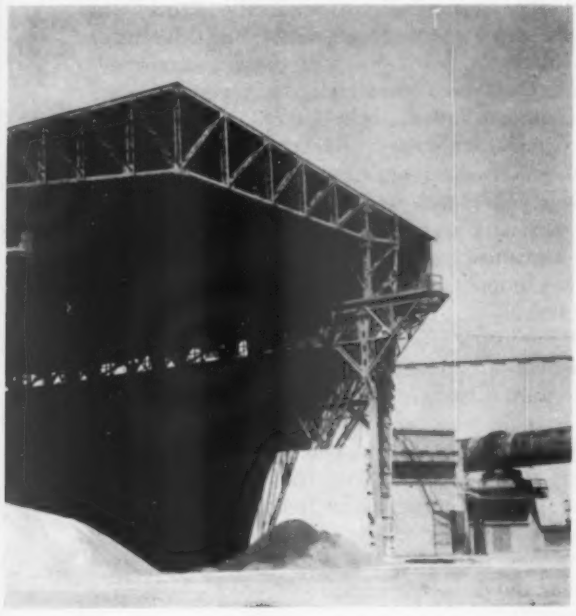
Cement is stored in eight steel silos. Each is 66 ft. high and 24 ft. in diam. and has a capacity of 1,100 tons. The silos are connected by Airslides and bucket elevators to the packing house where three packers are arranged in a single row. Three chain conveyors deliver bags to two flat-belt conveyors, and these belts deliver to a chute which drops the bags to the floor below.

A French system is used for bulk loading cement. Essentially a large pressure vessel, it is emptied by high-pressure air after being filled with cement. It handles 150 tph. and its operation is fully automatic.

Cement to be shipped in bulk can be loaded into a tank truck or bulk cement railway car at 340 bbl. per hr. A barge can be loaded at 700 bbl. per hr. If the shipment is by 87½-lb. bag, 340 bbl. per hr. can be loaded into a railway boxcar or a truck or onto pallets, and 570 bbl. per hr. can be loaded into a barge. For loading closed trucks, the plant features a telescopic conveyor which can be extended deep into the van.

A high-quality product is ensured by constant checking throughout the operation. The slurry is analyzed before and after blending. Samples of clinker are analyzed at regular intervals. Finally, the finished cement is thoroughly tested for compression and tensile strength, autoclave expansion, setting time and fineness, all according to CSA and ASTM standards.

The warehouse and maintenance shops are located in a 132 x 100-ft. building. The mechanical maintenance shop is fully equipped with up-to-date machine tools and is capable of handling practically all repairs. **END**



MAJOR EQUIPMENT REFERENCE

In quarry:
- Rotary drill ..... Joy Mfg. Co. (Canada), Ltd.
- Shovel, 3-cu. yd. ..... Bucyrus Erie Co. of Canada Ltd.
- Truck, 22-ton ..... Euclid Div., GMC

In crushing plant:
- Primary jaw crusher, 60 x 48-in. ..... } Canadian Allis-Chalmers Ltd.
- Vibrating screens, 5 x 12-ft. ..... } Canadian Allis-Chalmers Ltd.
- Secondary crusher (2) 5 x 16-ft. ..... } Canadian Allis-Chalmers Ltd.
- Tertiary crusher, reversible impactor ..... Pennsylvania Crusher Div.
- Pan feeders (2) ..... } Stephens-Adamson Mfg. Co. of Canada, Ltd.
- Belt conveyors ..... } Stephens-Adamson Mfg. Co. of Canada, Ltd.

Clay operations:
- Scraper, 4-cu. yd. crescent ..... Sauerman Bros., Inc.
- Wash mill ..... F. L. Smidth & Co. of Canada Ltd.
- Pump, 8-in. ..... A. R. Wilfley & Sons, Inc.

Storage:
- Bridge crane ..... } Applevage, S.A.
- Clamshell, 3-cu. yd. ..... } Applevage, S.A.
- Clay-slurry basin mixer ..... Dorr-Oliver, Inc.
- Inclined belt conveyor ..... Hewitt-Robins (Canada) Ltd.

Slurry preparation:
- Weighing feeders ..... Jeffrey Mfg. Co., Ltd.
- Raw ball mill, 36 x 9½-ft. Unidan ..... } F. L. Smidth & Co.
- Gear reducer ..... } F. L. Smidth & Co.
- Synchronous motor, 1,400 hp., 720 rpm. ..... Canadian Westinghouse Co. Ltd.
- Pump 6-in. ..... } A. R. Wilfley & Sons, Inc.
- Slurry blending pump, 8-in. ..... } A. R. Wilfley & Sons, Inc.
- Slurry mixers ..... Dorr-Oliver-Long Ltd.

Burning:
- Kiln, 426 ft. x 12 ft. 3 in. ..... } F. L. Smidth & Co. of Canada Ltd.
- Ferris-wheel feeder ..... } F. L. Smidth & Co. of Canada Ltd.
- Pumps, 6-in. (2) ..... A. R. Wilfley & Sons, Inc.
- Variable-speed motor ..... Sautter-Harle, S.A.
- Gear reducer ..... Falk Corp.
- Steam generator ..... Ames Iron Works, Inc.
- Clinker cooler ..... Fuller Co.
- Cyclone dust collector ..... Buell Engineering Co.
- Hammermill ..... Pennsylvania Crusher Div.
- Electrostatic precipitator ..... Ventillation Industrielle et Miniere

Clinker grinding:
- Weighing feeders ..... Jeffrey Mfg. Co., Ltd.
- Clinker mill ..... F. L. Smidth & Co. of Canada Ltd.
- Air separator ..... Sturtevant Mill Co.
- Bucket elevator & screw conveyors ..... Carton, S.A.
- Pump ..... } Fuller Co.
- Rotary compressor, Type C-175 ..... } Fuller Co.
- Dust collector, automatic bag-type ..... The Northern Blower Co.

Hard, durable aggregates give Golden's products an edge in competitive San Diego market

Premium granite steps up base-mix quality

RELATIVELY FEW QUARRIES on the Pacific Coast produce commercial crushed stone, mainly because other types of aggregate are readily available. One exception is the operation of the Kenneth H. Golden Co., Inc., San Diego, Calif., which also makes bituminous aggregates and soil cement.

Cement-treated road base is very popular in southern California, especially around San Diego. The continuous-mix batch plant used to prepare the subgrade at this operation was installed during 1957 and was later expanded, adding a five-ton automatic weighing hopper with dial scale.

Purpose of treating the base material with cement is to construct a stable subgrade that will resist erosion under the pumping action of a concrete slab. In addition, the stabilized subgrade is a way of providing a layer that is firm enough to hold a film of asphalt.

Material produced at the Golden plant is primarily a 1 x ¾-in. product, with specified fines gradations. About 5 percent portland cement is added to this aggregate to make the mix. The material is then mixed and sent to its place of use slightly damp. After compaction, the top is sealed with a bituminous material.

Other sizes of crushed granite made are ¾ x ½ in., ½ x ⅜ in. and ⅜ x 0. Over-all capacity is about 150 tph.

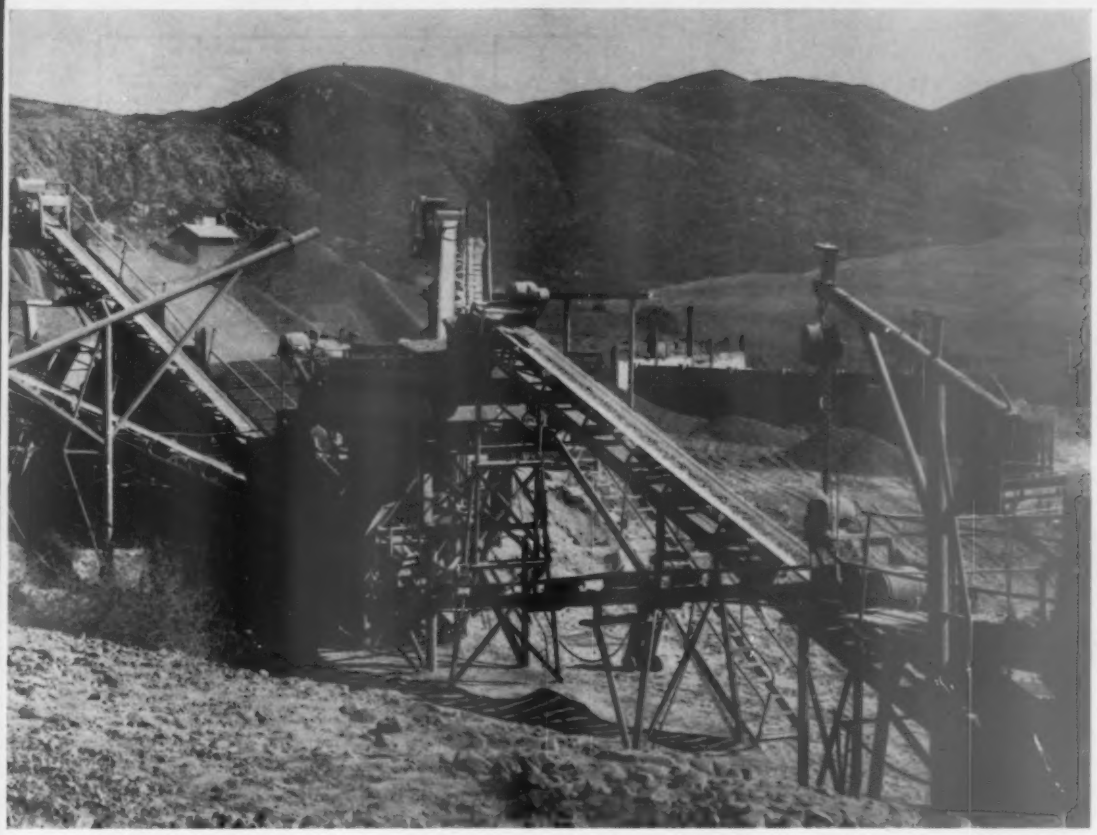
This plant is located in a low fringe of granite hills about eight miles northeast of the city. The operation is set up on three benches or levels. The lowest one, at road elevation, is the site of the 300-tph. soil-cement batch plant and the 2-ton batch black-top plant. Each of these plants is fed by individual belt conveyors that operate in reclaim tunnels under stockpiles of finished aggregate. Gravity gates are used in the tunnels.

The dry crushing and screening plant is located on the second level, and the quarry occupies the next, slightly higher elevation, located so that blasted granite can be pushed by tractor-dozer to the feed hopper of the primary crusher on the lower level.

Drilling in the quarry is done by a track-mounted drill which puts down the relatively shallow holes. Ammonium nitrate is used as the blasting powder.

The crushing plant is efficient and simple in design: Crushed rock from the primary crusher is conveyed to a surge bin or "pocket" built so that when it is full, any excess can be 'dozed aside and later pushed back into the system.

Under the pocket is an apron feeder serving the



The Mission Gorge plant of Kenneth H. Golden—one of the few granite producers in California

secondary jaw crusher. Product of this crusher is conveyed to a 2-deck, 33 in. x 8 ft. scalper screen, below which is a 4-ft. standard cone crusher. Through material from the screen and crusher is conveyed to a double-deck, dry final screen.

From the final screen, stacker belts finger out over the area serving the black-top reclaim tunnel. Aggregate for the subgrade batch plant is pushed from these piles to the area over the subgrade reclaim tunnel by a tractor-dozer. The two tunnels are close together and practically parallel.

A 3-ft. short-head cone crusher operates in closed circuit with the final screen. It can take plus rock from the screen, and its product can be conveyed back to the belt serving the screen. **END**

MAJOR EQUIPMENT REFERENCE

Track-mounted drill	Ingersoll-Rand Co.
Compressor, IR-600 Gyroflow	Ingersoll-Rand Co.
Primary feeder	Ingersoll-Rand Co.
Primary crusher, 30 x 42 in., jaw	Pioneer Engineering, Div. of Poor & Co.
Secondary feeder	Iowa Mfg. Co.
Secondary crusher, 18 x 30-in. jaw	Smith Engineering Works
Cone crusher, 4-ft. standard	Nordberg Mfg. Co.
Cone crusher, 3-ft. short head	Nordberg Mfg. Co.
Conveyors	Barber-Greene Co.
Scalper screen, 33 in. x 8 ft.	Overstrom & Sons, Inc.
Final screen, 4 x 14 ft.	Nordberg Mfg. Co.
Subgrade batch plant	Barber-Greene Co.
Black-top plant	Madsen Iron Works

Road-base mix is a western specialty, and it's even better when granite aggregates are used

Choosing the right screening surface is an art— not a science

How to select the proper screening surface

*by W. L. Price**

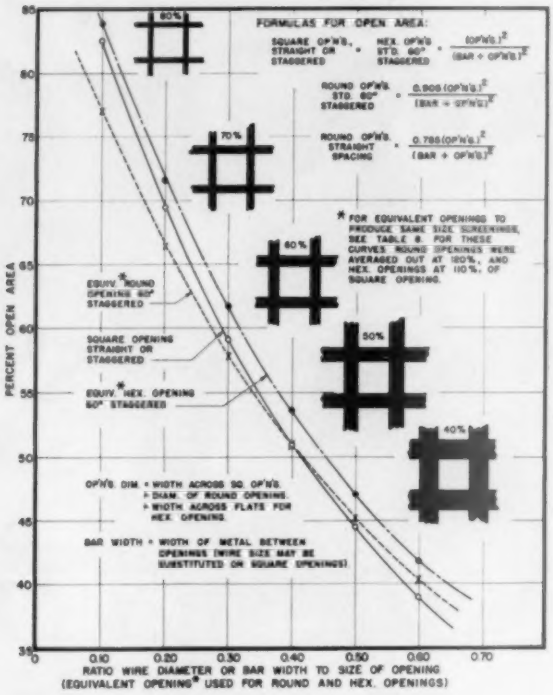

FORMULAS FOR OPEN AREA:
SQUARE OP'NG'S., STRAIGHT OR STAGGERED
HEX. OP'NG'S STD. 60° STAGGERED
ROUND OP'NG'S STD. 60° STAGGERED
ROUND OP'NG'S STRAIGHT SPACING
* FOR EQUIVALENT OPENINGS TO PRODUCE SAME SIZE SCREENINGS, SEE TABLE 8. FOR THESE CURVES ROUND OPENINGS WERE AVERAGED OUT AT 100%, AND HEX. OPENINGS AT 110%, OF SQUARE OPENING.
80%
70%
60%
50%
40%
EQUIV. * ROUND OPENING 60° STAGGERED
SQUARE OPENING STRAIGHT OR STAGGERED
EQUIV. * HEX. OPENING 60° STAGGERED
OP'NG'S. DIM. = WIDTH ACROSS SQ. OP'NG'S. = DIAM. OF ROUND OPENING = WIDTH ACROSS FLATS FOR HEX. OPENING
BAR WIDTH = WIDTH OF METAL BETWEEN OPENINGS (WIRE SIZE MAY BE SUBSTITUTED ON SQUARE OPENINGS)
PERCENT OPEN AREA
RATIO WIRE DIAMETER OR BAR WIDTH TO SIZE OF OPENING (EQUIVALENT OPENING* USED FOR ROUND AND HEX. OPENINGS)

Figure 1. Percentage open area for various types of openings in screening surfaces

A MAN IN THE MARKET FOR SCREENING SURFACES soon discovers that proper selection is an art —not a science. There are no handbooks with formulas to deliver exact answers for exact needs. Only experience in aggregate processing and close attention to actual operational details can provide a guide to an intelligent selection of wire cloth and perforated plate.

Granted, the subject is a complicated one, but I have attempted to simplify it as far as it is possible for the average screen user by compiling comparative specification data and cost figures. No attempt will be made to present service comparison records between different cloths or cloth and plate—that would require a separate paper based on prolonged service testing. Here, we are concerned with comparative data up to the point of installation.

The ideal screening surface, from the producer's point of view, would have four advantages: (1) 98 percent or greater open area; (2) no enlargement of the opening; (3) a metal hard enough to wear for years on end and yet ductile enough to not crack up or break in pieces from the action of the vibrating screen; (4) an absolute minimum cost.

Since these ideals are impossible to obtain, any selection for screen surface must be a compromise of the four. The screen buyer must continually compromise between open area and heavy wear-

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Trade Names		Description
"Double Crimp"		Used where opening is relatively small with respect to wire diameter (3 to 1 or less). Tightest weave for most accurate sizing.
"Arch Crimp" "Hylo-Crimp" "Press-Lock"	Crimp offset is about 50 percent of wire diameter.	Normally used for insuring tightness of weave where opening is large with respect to wire diameter (3 to 1 or greater).
"Intermediate" "InterCrimp"		Same as above, cross wire must be at every third crimp for locking the weave.
"Sta-Smooth" "Smooth-Top" "Flat-Top"	Normally starts at 5/8 inch opening and larger. Crimp is 100 per cent of the wire diameter.	Used for longest life because there are no vulnerable projecting portions to wear off first. Caution must be exercised in weaving to make this a tight weave. This weave offers least resistance to flow of material.

Figure 2. Types of weave commonly available in woven wire screen cloth

**A summary of a paper presented at the National Sand and Gravel Association meeting in New Orleans, La., February 18, 1959, later published by NSGA as Circular No. 80, "Wire Cloth and Perforated Plate for Vibrating Screens." Mr. Price is Engineering Manager, Keystone Div., Dravo Corp., Pittsburgh, Pa.*

All Teeth Stay Sharper, Last Longer with

Stoody TUBE BORIUM!

ROAD RIPPER TEETH *averaged 7 to 10 times more life after receiving protection with Tube Borium. Notice how tooth chisels down with wear.*

Wear and loss of digging efficiency are common complaints on all types of teeth—*ditchers, power shovels, rippers, draglines, dredges, etc.* Hard-facing greatly prolongs useful life. But even so, each tooth can be made to last *far longer than ever before* and *retain its sharpness* by hard-facing with Stoody TUBE BORIUM!

Why is this one hard-facing alloy so superior on teeth? *No other hard metal equals TUBE BORIUM in straight abrasion resistance.* Its deposits are thickly peppered with tiny tungsten carbide particles. Wear is virtually defied by this hardest-of all man-made metals.

More expensive in first cost, Tube Borium shows excellent economy in overall service life, outlasting other materials many times over. And longevity is not your only benefit. Remember, one major cost of any hard-facing application is welding time. Use the best, Tube Borium, and you'll save several applications of less effective alloys besides eliminating needless downtime!

Your Stoody dealer (check the Yellow Pages of your phone book) will supply details, literature or recommendations. Ask about Tube Borium—or write direct.

SHOVEL TEETH *wore out in one 8-hour shift. A few beads of Tube Borium applied during noon break prolong life 6 or 8 full shifts. They are then repointed and hard-faced for further use.*

DRAG LINE TEETH *used in slag dump were hard-faced with Electric Tube Borium—outlasted unprotected teeth 9 to 12 times.*

TUBE BORIUM is available in stick form for oxy-acetylene or manual electric application. Also in continuous wires for automatic and semi-automatic electric application. Various mesh sizes for individual uses.

DITCHER TEETH—*A few ounces of 30-40 Electric Tube Borium on points of teeth increased life 6 to 8 times over factory originals.*

STOODY COMPANY
11942 East Slauson Avenue • Whittier, California

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Screening surface cont'd. from page 90

ing surface; between metal hardness and its ductility (ability to withstand reversal of stresses on a vibrating screen). It has been correctly stated that a vibrating screen is the best possible fatigue testing machine for metals in use today.

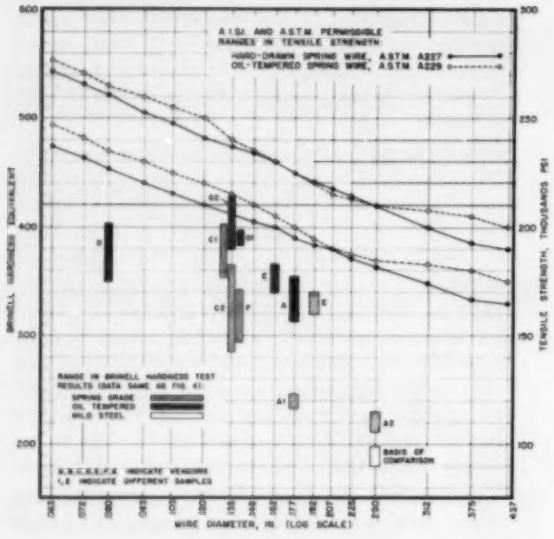
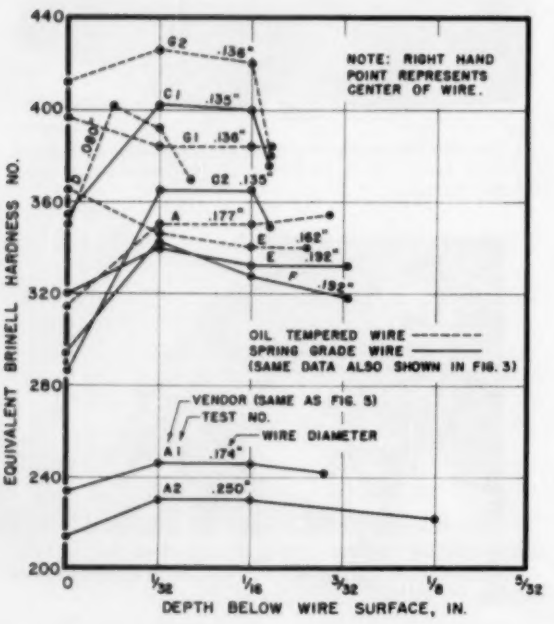

A.I.S.I. AND A.S.T.M. PERMISSIBLE RANGES IN TENSILE STRENGTH
HARD-DRAWN SPRING WIRE, A.S.T.M. A227
OIL-TEMPERED SPRING WIRE, A.S.T.M. A229
BRINELL HARDNESS EQUIVALENT
TENSILE STRENGTH, THOUSANDS PSI
RANGE IN BRINELL HARDNESS TEST RESULTS (DATA SAME AS FIG. 4)
SPRING GRADE
OIL TEMPERED
MILD STEEL
BASIS OF COMPARISON
WIRE DIAMETER, IN. (LOG SCALE)

Figure 3. Comparison between actual hardness tests of samples from woven wire cloth and specification ranges for drawn steel wire converted to Brinell hardness

Figure 4. Hardness tests of samples from wire screen cloth



In the wire cloth applications, the reasons for replacement are normally one of these: (1) Actual abrasion of the metal has worn the wires so thin that the cloth will break apart. (2) The wires are broken from fatigue (bending back and forth) before wearing thin. The screen operator should look at the cloths which have been removed to see how they have worn out, whether it is a fatigue break or an actual wearing through. This will determine whether to order harder or softer wire the next time.

Proper tensioning of a wire cloth is critical for long life. If other things are equal, it is advisable to purchase screen cloth so that the side tension is on the warp wire (the less deeply crimped of the two intersecting wires). For the best wear life, the user should try to use as hard a wire as possible without suffering from fatigue breaking.

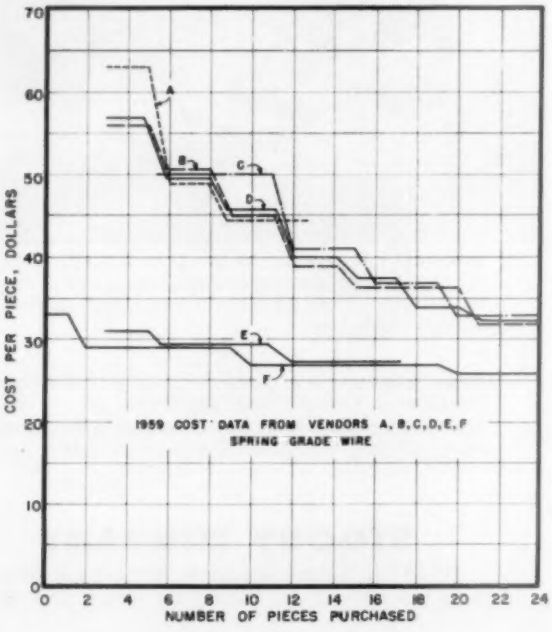
Percentage of open area is important to the user since it is an indicator of screening efficiency. The chart (Fig. 1) shows plainly how the open area of a given surface varies as the square of the openings and wire size. It also gives the formulas for calculating open area percentage.

Table No. 1 gives an outline of the standard types of opening available in wire cloth along with their advantages and disadvantages. Fig. 2 shows the various types of weave commonly available in wire cloth with reasons for use of each type.

One other type of weave should be mentioned.

Please turn to page 94

Figure 5. Relationship of wire cloth cost to quantity (for 5 x 4-ft. section with ¾-in. opening and ¼-in. wire, equipped with hook strips)



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It's a bulldozer with exclusive "radius control" of dozing depth which allows you to bulldoze with inch-close accuracy.

It's a scraper with the stripping ability and fast, live "boiling action" of large, expensive carry-type earthmoving scrapers.

It's a Skid-Shovel with patented pry-over-shoe break-out action which gives over *5½ tons* of break-out force, for prying out stubborn materials, stumps, and boulders.

It's a clamshell with exclusive ability to "surround" loose materials for loading, and to dump sticky materials through the bottom of the bucket.

New T-340 FOUR-IN-ONE gives you versatility unlimited in ¾ cu yd* size!

Now you can have four-machine utility at the lowest cost ever! New T-340 International Drott Four-In-One combines in one machine the actions of front-end loader, dozer, carry-type scraper, and many-purpose clamshell. With these four machine actions in one, you can handle dozens of specialized jobs single-purpose rigs can't even touch!

The Four-In-One with the new 31 dhp International T-340 crawler makes an unbeatable team for lowest-cost earthmoving and materials handling. The T-340 delivers the most push and pull-power in its size class. Famous Four-In-One Skid-Shovel versatility has never been equaled by any other loader on the market. Together, the T-340 and Four-In-One give you a wider job range and greater earning capacity than ever before available in the small crawler loader field.

Find out first hand . . . see the IH dealer nearest you! For his name, and specification folder, write International Harvester Company, Dept. RP-8, P.O. Box 7333, Chicago 80, Illinois.

*⅞ *cu yd, heaped.*

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL® DROTT®

Screening surface

cont'd. from page 92

This is "loose" weave, used only when blinding is a serious problem while using a square opening wire. In a loose weave, the wire is pre-crimped oversize so that the meshes can "work" slightly to help pass a wedged particle. The big disadvantage to a loose weave is the fact that the working of one wire on the other reduces the wire life up to 20 percent. For this reason, it should be used only as a last resort to cure blinding.

Two more desirable methods of reducing blinding on wire cloth are: A reduction in the wire size (disadvantage of shorter life); the use of rectangular or slotted openings as shown on Table No. 1.

Quality of the wire determines the wearing life of the cloth, other factors being equal. Table No. 2 shows a comparison of the wire commonly available for wire cloth. This covers .50—.55 carbon wire and .60—.65 carbon wire.

Mild steel will cost in the vicinity of 20 percent less than the spring grade wire shown. Mild steel wire is not shown on this table, even though it has been used for many years in the past as a standard. It has been gradually replaced by the two types of wire shown. Mild steel is normally not considered an economical investment here. Stainless wire is not covered since it is very expensive and normally used only on special applications.

Wedge type or a "T" head wire has not been discussed. In this type of cloth, the specially shaped wires are set up parallel and held in place by coiling around a heavy cross wire or by being pinned together transversely every three or four inches and spaced by means of separators. This wedge type cloth is normally furnished in openings from .005 to ⅜ in. It is not normally considered for sizing but normally used more in difficult dewatering applications. This type of weave obtains a very high percentage of open area for small openings. It is very expensive when compared to the other types described here. It is normally only recommended in stainless wire because of the bad effect of rusting on small openings.

In stainless wire, the wedge type costs in the neighborhood of $18 per sq. ft. Mild steel is in the vicinity of $13 per sq. ft. For dewatering jobs or recovery of media in HMS plants, it is usually possible to justify this high cost for wedge type wire because of the following: Smaller openings with the same open area; less blinding; an increase in

Please turn to page 97

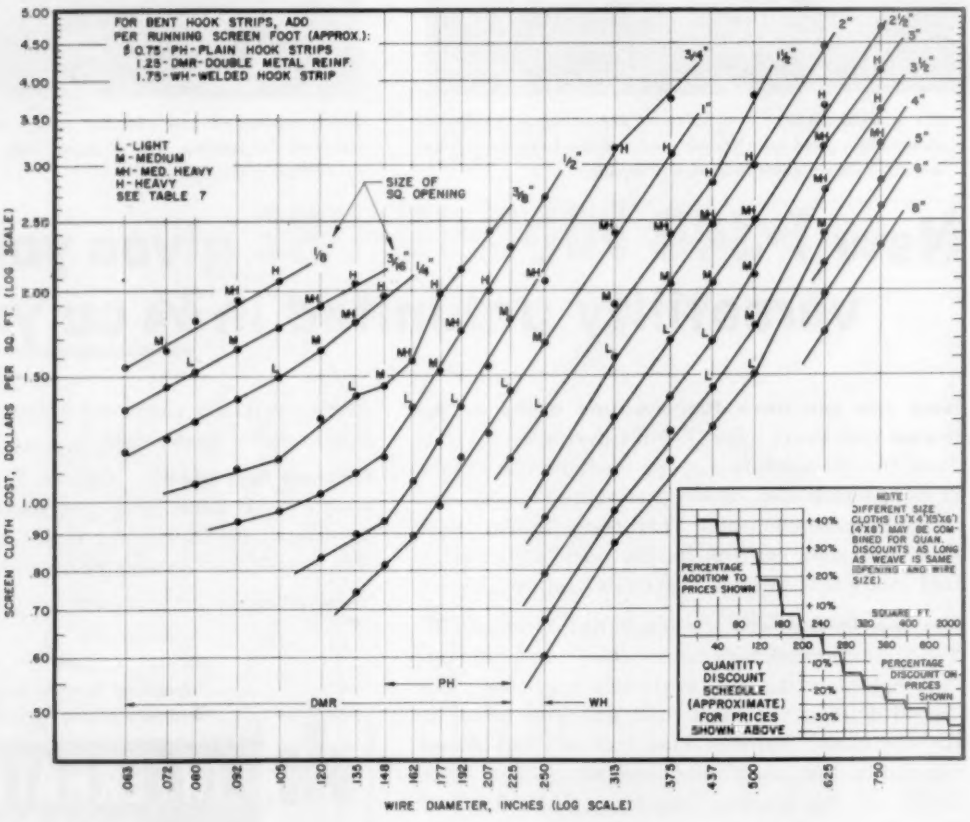
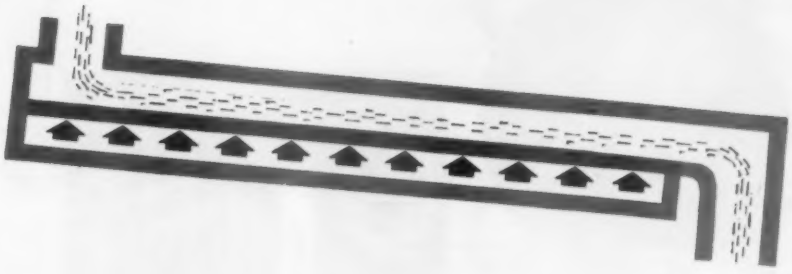


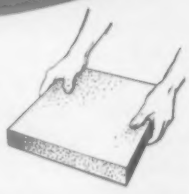
Figure 6. Wire screen cloth cost (based on 200 to 239 sq. ft., plain cloth, oil-tempered, high-carbon spring wire; see discount chart for other quantities)

KENNEDY

AIR FLOAT

the better-built, more efficient air-gravity conveyor provides the answers to Dry Solids Conveying





The special porous plate is exclusive with KENNEDY AIR-FLOAT. It is strong, resistant to abrasion and temperature and has a smooth surface texture.

Sections are ruggedly designed, formed on modern production equipment and completely assembled before shipment.

Q. How does AIR-FLOAT work?

A. *The dry material to be conveyed is fed on to a smooth, rigid, porous plate through which low pressure air continuously diffuses. Because the conveyor is inclined about 6 to 8°, the aerated material flows by gravity.*

Q. What distinguishes the KENNEDY AIR-FLOAT from other air-gravity conveyors?

A. *Primarily, the special porous plate. Also the casing is of heavier construction, flanged and channeled for greater rigidity.*

Q. How is this special plate better than other porous media?

A. *The AIR-FLOAT porous plate has literally millions of tiny pores through which the air diffuses uniformly for thorough aeration of the conveyed material. The plate is thicker, stronger, temperature- and wear-resistant, and has a very smooth surface texture.*

Q. How does this improve conveying?

A. *AIR-FLOAT has a much higher capacity than competitive air-gravity conveyors. Blind spots are eliminated and the angle of inclination is less critical.*

Q. What about maintenance?

A. *The KENNEDY AIR-FLOAT is the nearest thing to a completely maintenance-free conveyor that has ever been devised.*

Q. Can turns be made?

A. *Direction changes up to 45° are made with standard pieces. These can be combined for greater angles.*

Q. Are accessories available?

A. *Yes. End and side discharge boxes, splitters, control gates, transitions, bin extractors and required blowers can be provided.*

Q. Have KENNEDY AIR-FLOAT Conveyors been fully tested and proven?

A. *Yes. For more than 12 years AIR-FLOAT Conveyors have been successfully used in KENNEDY-designed cement and lime plants. With this background of experience, KENNEDY is now making AIR-FLOAT available to industry, mass producing it to sell at competitive prices.*

For more information on AIR-FLOAT, ask for Bulletin 58-K.

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Continuing research conducted by Coates has developed a low cost, high performance product. Carbex Triple-Forged Grinding Balls are rounder for better wear, harder for more efficient grinding, tougher to withstand stress. Grind better for less with Carbex Balls, proven your best buy.

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COATES STEEL PRODUCTS CO.

GREENVILLE, ILLINOIS

LARGEST EXCLUSIVE MANUFACTURER OF GRINDING MEDIA

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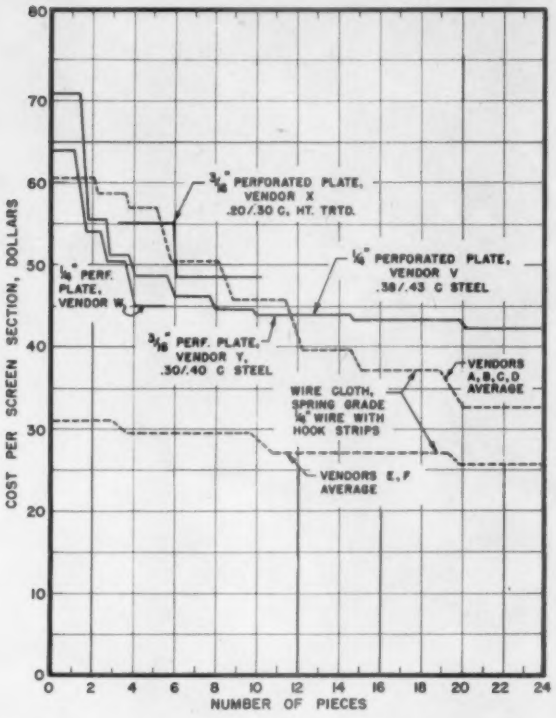

COST PER SCREEN SECTION, DOLLARS
NUMBER OF PIECES
3/16" PERFORATED PLATE, VENDOR X .20/.30 C, HT. TRTD.
1/8" PERF. PLATE, VENDOR W
1/8" PERFORATED PLATE, VENDOR V .38/.43 C STEEL
3/16" PERF. PLATE, VENDOR Y, .30/.40 C STEEL
VENDORS A, B, C, D AVERAGE
WIRE CLOTH, SPRING GRADE 1/4" WIRE WITH HOOK STRIPS
VENDORS E, F AVERAGE

Figure 7. Cost comparison between perforated plate and wire cloth (quoted prices for 5 x 4-ft. section, ¾-in. sq. opening)

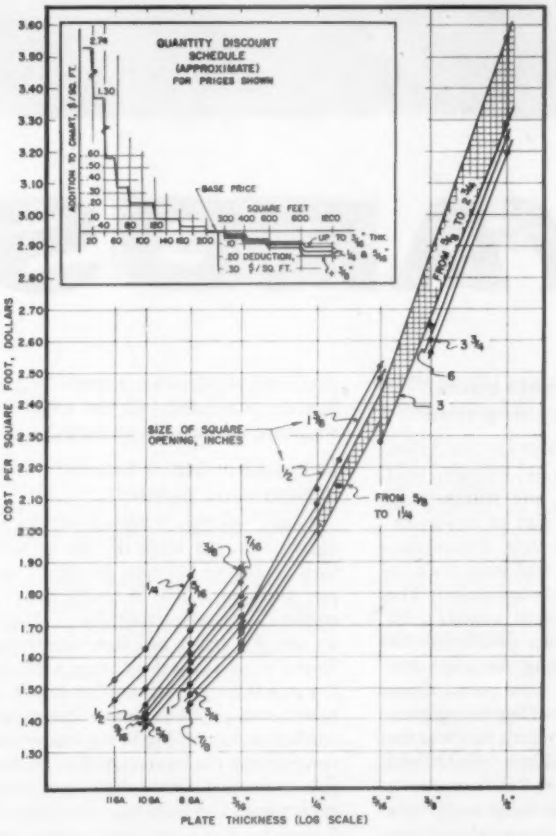

QUANTITY DISCOUNT SCHEDULE (APPROXIMATE) FOR PRICES SHOWN
ADDITION TO CHART, $/SQ. FT.
BASE PRICE
SQUARE FEET
.20 DEDUCTION, .30 $/SQ. FT.
COST PER SQUARE FOOT, DOLLARS
SIZE OF SQUARE OPENING, INCHES
FROM 5/8 TO 2 3/4
FROM 3/8 TO 1 1/4
PLATE THICKNESS (LOG SCALE)

Figure 8. Approximate costs of perforated screen plate (data supplied by vendors on basis of 200 sq. ft., .30/.40 C steel not heat-treated or .20/.30 C steel heat-treated; add $4.50 per section for flanged hook strips)

Screening surface

cont'd. from page 94

wear life greater than the ratio of the increased cost.

Oil-tempered wire is a better bargain since, under proper use, it will give much additional wear life for an average increased cost of about 8 percent, according to Table No. 2. On Fig. 3 are shown actual cross section hardness tests on random wire cloth samples. The identifying letters correspond to those on Fig. 5.

Fig. 4 shows a tabulation of these same actual hardness tests presented in different form. The hardnesses shown were measured with a diamond point micro-hardness tester. No attempt will be made to interpret this data except to say that some spring grade wires have tested better than those offered as oil tempered.

Two general statements may be made about the cost of wire cloth: (1) The quoted prices from various vendors will be very similar as indicated by the prices of Vendors A, B, C and D shown on Fig. 5. This chart shows the price for a 5 x 4 ft. section of ¾ in. opening by ¼ in. wire. (2) The second axiom of wire cloth purchasing is that the quantity is all important in comparing prices.

A quick glance at the method of manufacture will indicate just why this is so. A weaving loom must be set up for each different size of wire cloth. This setup time must be assessed against the total production. The other factor is the amount of trimmed waste wire required for each job set up. These two factors account for the rapid drop in price with quantity increase in Fig. 5. It should be noted that the price difference between the two price groups, A-D and E-F, start out at about 100 percent in small quantities; but by the time there is an appreciable quantity, the gap is narrowed to about a 20-percent difference in price.

Fig. 6 shows the 200 sq. ft. price structure for one of the four vendors (A-D). As expected, the price per square foot in the larger openings increases sharply as the wire size is increased. This is evident by the steep slope of the curves. As the smaller openings are approached, the change in wire size does not affect the price as drastically.

It can be seen that the "light" wire series of cloths averages about $1.50 per sq. ft. in this 200-sq. ft. bracket, while the "heavy" classification is about $2.00 per sq. ft. from ⅛ to ½ in. square openings and jumps to $3.00 per sq. ft. from ¾ to 2 in. opening. From 2½ in. opening up, the

Please turn to page 100

6 YARDS

A ten or twelve yard tandem-axle truck loaded in 60 seconds!

***Two* 23-ton semis heaped in three or four minutes!**

***Two* passes for the smaller truck, five for the two bigger ones *combined*.**

Someone's dream? Not any more! It's been standard practice at Stony Creek Stone Company's pit near Indianapolis for over two years now. That's when their big 6 *yard* Model 375A Michigan Tractor Shovel went to work.

Big production cuts costs, reduces truck waiting time

Stony Creek's problem up until then had been a common one: "How to hold down loading costs, and reduce truck waiting time in the face of rapidly-expanding customer demands." Fast rubber-tired Tractor Shovels had long since replaced cranes and crawler-loaders. The biggest rubber-tired units available, 2¼ yds, were in use. But, production requirements were calling for still more loading capacity. At that point, Company General Manager Dick Irving got a big idea. Visiting the Clark booth at the Road Show, he saw the new 6 yard Model 375A Michigan. "There," he thought, "is a Tractor Shovel that could *really* do a job for us. It could give us enough capacity to replace two smaller Tractor Shovels *plus* handle all the expansion we anticipate for years to come."

Michigan output totals 2,500 tons daily

Today, the big Michigan and its *one* operator do the work of two or more smaller Tractor Shovels. Michigan output averages 2,500 to 3,000 tons of crushed limestone every day. "Despite its size, I'd rather run this big Tractor Shovel than any other," says Operator Carroll White. "It handles easily. It moves and responds just as fast as any smaller loader. Its big low-pressure tires really absorb the bumps. And its smooth ride sure cuts down on the fatigue you'd expect from a 10-hour day—even though I alone load as much stone as two men

Notice how much this big new Michigan *looks* like the smaller Michigans you see everywhere. It handles as easily as they do, too—with power steer, power-shift, torque converter, planetary wheel drive-axles standard. Its entire all-Clark power train is the same design as that job-proved in the 11,000 Michigans now in the field.

Specifications	Model 375A	Model 275A
Bucket capacity (standard SAE ratings)	6 yards	4 yards
Lifting capacity	30,000 lbs.	22,000 lbs.
Weight	61,900 lbs.	46,000 lbs.
Speeds (forward and reverse)	0-25 mph	0-28 mph

PER PASS

did when the pair of 2¼ yard rubber-tired Tractor Shovels were working."

Five passes heap two semis

And that's another reason White prefers the 375A. Higher production! With the smaller machine, White needed at least four minutes and eight passes to load one 23-ton haul truck. With the Model 375A, White regularly loads *two* 23-ton semis in the same time or less—in only 2½ passes each. Two-and-a-half passes? Yes, White does it like this: Two heaped loads go into the truck. On the third load, precise hydraulic controls let White hold bucket so that only half its load is dumped. That fills one truck. The other half-load is fed into the second truck. Then, two more full loads sends this truck on its way too. Thus: five passes, two truck-loads.

Efficiently loads small trucks, too

White even prefers to load a *five-yard truck* with the 6-yard Michigan. Here, the Tractor Shovel bucket is allowed to extend beyond the back end of the truck when dumping. May *sound* wasteful, but before the loaded truck can shift into second, one quick swipe of the Model 375A bucket has cleaned all spillage.

Model 375A easy to maintain

White feels the big Model 375A is as easy to run as *any* Michigan Tractor Shovel—perhaps even a little easier because of its greater weight and better stability. The new Tractor Shovel is easy to take care of, too. In only 10 minutes each morning, White makes his daily maintenance check. Proper care, plus rugged construction, have held repairs to virtually nothing. In the many months Stony Creek has had the Model 375A, there has been *no maintenance at all* on the job-proved Clark power train.

Clark distributors are ready to *show you* this big new dependable 6 yard Michigan, as well as the new almost-as-big 4 yard Model 275A. Call to arrange a date.

Michigan is a registered trade-mark of

CLARK EQUIPMENT COMPANY

Construction Machinery Division
2481 Pipestone Road
Benton Harbor 10, Michigan
In Canada: Canadian Clark, Ltd., St. Thomas, Ontario

CLARK® EQUIPMENT

Table 1. Types of standard openings available for woven wire screen cloth

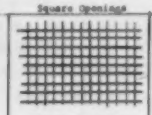
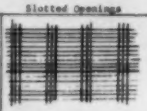
	Square Openings	Rectangular Openings	Slotted Openings
			
	Single Sheet Wire	Single Sheet Wire	Triple Sheet Wire
Typical Trade Names	"Square Mesh" "Square Mesh" "Square Mesh"	"Tuo-Cap" "Rub-Tong" "Oblong"	"Ty-Rod" "Sta-Clear" "Long-Slot"
Open Area	Smallest	Intermediate	Largest
Wire Sizes for Given Opening	Lightest	Intermediate	Heaviest
Sizing Efficiency	Most accurate.	Intermediate accuracy. (Will let some flat particles through.)	Least accurate. (Will let most flat particles through.)
Blinding	Most easily blinded.	Less blinding.	Least blinding. (Wires will work to pass particles through)

Table 2. Typical approximate crimping data for various wire diameters and ⅜-in. sq. opening. The warp wire must decrease in depth of crimp as the wire diameter grows larger for given opening since the fill wire must be pushed in place across the crimps of the warp wire. This becomes more difficult for relatively heavy wires with deep crimps

Wire Diameter, inches	Theoretical Crimp Depth Percent of Wire Diameter	
	Warp Wire (Fixed Wire in Weaving)	Fill Wire (Wire Dropped in Place)
.135	100	100
.148	90	110
.162	85	115
.177	80	120
.192	75	125
.207	65	135
.225	57	142
.250	50	150

Screening surface *cont'd. from page 97*

price of the heavy classification goes to about $4.00 per sq. ft. (All prices are in the 200-sq. ft. bracket.)

The importance of quantity in setting the price is shown graphically in the discount schedule in Fig. 6—increasing up to 40 percent over the 200-sq. ft. bracket shown and reducing an additional 25 percent for larger quantities.

Perforated screen plate is generally available with three types of opening for the sizing of aggregates: (1) Square opening—(staggered or in-line). In general, the staggered opening is preferred since it should do a better screening job with the same open area at the same price as the in-line perforations. Most aggregate specifications are stated in square openings.

(2) Round opening—(60 deg. staggered or in-line). The in-line round opening is not recommended normally because of the loss in open area (see Fig. 1 for comparison). The main advantage of the round opening over the square is that since it has no parallel sides it is less likely to wedge a particle in place. Thus, the round opening is less

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Table 3. Grades of available wire cloth and trade names (carbon steel). Key: (1) Although there are natural differences of opinion, HarriSteel has always been marketed on a guaranteed basis as a harder and more abrasion-resistant wire with the cloth costing over 200 percent more than other oil-tempered shown in ⅛-in. and 3/16-in. openings, tapering off to equal prices around ½-in.

	A.	B.
Generalized Description	Hard Drawn "Spring" Wire High Carbon MB and WMB (ASTM A 227)	Oil Tempered Crimping Grade High Carbon MB and WMB (ASTM A 229)
Permissible Carbon Range, Percent	.45 to .70	.55 to .70
Normal Carbon Content, Percent	.50 to .55	.60 to .65
Description of Manufacture	Final hardness and tensile strength obtained by drawing only. No heat treatment except annealing as required.	Drawn to final size, heated to critical temperature about 1700 F -- then quenched to extreme hardness. Tempered back at 600 F to 900 F to desired hardness.
Relative Wire Cloth Cost	100.0	108 percent average
Estimated Wear Life	100.0	125 percent minimum to 200 percent.
Trade Names for Principal Vendors (incomplete listing)		
1. Buffalo W. W. Co.	"Buffaloy"	"Super-Buffaloy"
2. Cleveland W. C. & M. Co.	"Alloy No. 2"	"Cleloy"
3. HarriSteel Prod.	---	"HarriSteel"(1)
4. Hewitt-Robins, Inc.	"Gyralloy"	"Super-Gyralloy"
5. Hoyt Wire Cloth Co.	"Abraso"	"Super Tough"
6. Ludlow-Saylor W. C. Co.	"Super-Loy"	"Ludloy"
7. National Wire Cloth Co.	"Nataloy"	"Super-Nataloy"
8. W. S. Tyler Co.	"Tyloy 77"	"Tyloy 88"
9. Wickwire-Spencer, C. F. & I.	"Wissco-Loy"	"Super-Tempered"

Enter 1067 on Reader Card

If any of your work is in sandy soil, you well know all the maintenance tracks need. This New Jersey company figured they spent $22,000 in parts alone every year. So they switched to rubber, now

SAVE BIG REPAIR BILLS, GET MORE WORK DONE!

Bennett Sand & Gravel Company, Manasquan, New Jersey, qualify as *real experts* on track wear. All their work is in gravel or high-silica sand, which forms the floor of their 1,000 acre quarry. In the past, they figured re-bushing and new sprockets were needed on each of their crawler-dozers twice a year. Complete sets of rails had to be replaced every eight months. Rebuilding jobs on three crawler dozers cost over $22,000 per year *in parts alone.* Shop time for the track repairs totalled *400 to 500 man-hours per year.* To eliminate this high cost, Bennett decided to try rubber. Their local Michigan Distributor heard about it, got permission to demonstrate a Model 180 Tractor Dozer. Bennett management liked it so well, they insisted it stay right on the job.

"Tires don't wear out"

The Michigan started to work in summer, 1956. To date, the tires show virtually no wear. Paul Bennett, Jr., Company Vice President, says he expects them to "last indefinitely." For comparison, he points to a tractor loader which has worked constantly and still has original tires after 6 years. A bottom-dump hauler has original treads after 9 years. So, Bennett figures, the tires on their Michigan dozer, with its steerable wheels, should be good for thousands of hours. The machine does everything, too . . .

Spread at 6 scattered dumps

Its regular jobs include:

1. Keeping three big sand dumps pushed off. Types of sand: mason, concrete and coarse grade. Job was once tried by another make of rubber-tire dozer, but it bogged down hopelessly in the often-wet sand.
2. Spreading truck-dumped gravel at three dumps: pea-size, ⅜" and 1" stone. Major advantage in this operation is way Michigan's low-pressure tires don't crush the gravel . . . a real problem with crawlers when selling gravel for state work.
3. Cleaning spillage from haul roads.
4. Cleaning around washer.
5. Building roads at secondary pit five miles away. Unit gets to this assignment *under its own power* at 27 mph.

"Easier to run than crawlers"

"We do about 50 kinds of odd jobs, as well," says John Gifford, a dozer operator with Bennett *since 1940.* "The Michigan is a pleasure to run all the time. Hit a good-sized stone while driving a crawler, for instance, and you really get a jar. In our Michigan, you roll right over it, stay in perfect control. It's a cinch to operate the Michigan after running a crawler—and a lot faster too. *Michigan gets around the plant as fast as a truck,* handling dozens of jobs—doing well at all of them!"

Available on lease-purchase

If slow speeds and sand-in-the-tracks are grinding away at your profits, it will pay you to get full facts on this Dozer. Your local Michigan Distributor will be glad to arrange a trial demonstration—*you* pick the job. You *needn't* keep the Michigan we demonstrate . . . but we guarantee if you have any work in sandy soil, or any scattered odd jobs, you'll be tempted. All sorts of purchase plans can be arranged . . . including no-money-down, pay-as-you-profit lease-purchase.

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CLARK EQUIPMENT COMPANY
Construction Machinery Division
2481 Pipestone Road
Benton Harbor 36, Michigan
In Canada: Canadian Clark, Ltd.
St. Thomas, Ontario

CLARK® EQUIPMENT

THIS MONTH'S CERTIFIED OWNER REPORTS

ROCK & FILL INC., FT. LAUDERDALE, FLA.

"Tires Last 7 Times Longer on Case W-9"

Loading Florida's highly abrasive coral rock and sand is so rough on equipment that Rock & Fill Inc., of Ft. Lauderdale, found tires on competitive-make loaders lasted only about *one month*, due to excessive wheel slippage. However, after switching to a 6000-lb. capacity Case W-9, with its *smooth-pulling* 4-wheel-drive, and power-transfer differential, Manager R. W. Hottenstein reports, "We've been running continuously *60 hours a week for over seven months without downtime or noticeable tire wear.*"

JAMES BROS., WAUKESHA, WIS.

"Our Case W-9 Loads 7-yd. Trucks in 2 Min."

Rudy Schilberg, Vice President of James Brothers Sand & Gravel Co. says: "This 1¾-cu. yd. Case Terra-load'r beats anything we've ever owned. It's much faster, easier to handle, and gets much bigger loads of bank-run sand without stalling. Its breakaway force is terrific! With the W-9, I can load 7-cu. yd. trucks in 2 minutes, 10-yard jobs in about 3 minutes." Schilberg also likes the speed, balance and mobility of the W-9 for handling multiple stockpiling and loading operations over a ½-mile plant area.

M&S STONE QUARRIES, GRANTSVILLE, MD.

"Best Crawler We've Seen for Rock"

Renell Giconi, owner of M&S Stone Quarries, readily admits his operation of prying huge slabs of rock, 4′ to 20′ long, out of a mountain top, is real punishment for any tractor. "Competitive crawlers just couldn't take it," Giconi reports, "but this Case 1000 power-angling dozer has the *best track system I've ever seen.* It absorbs all the pounding we give it and comes back for more."

"The automatic torque converter in Case Terramatic Drive is also a big advantage," Giconi continues, "because it gives the '1000' *double the crowding power without shock loads, and without clutching or stalling.* Case power-steering and power-shift are important, too, since I have only one hand for operating the controls.

"When it comes to maneuverability, for prying out rock, building access roads and stripping topsoil, we've never seen anything to match the Case 1000's *counter-rotating* tracks, and ability to *power-angle* the blade to the right position on-the-go from the operator's seat."

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CASE

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Company .....

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City ..... State .....

CT-CL-317

Screening surface cont'd. from page 100

likely to blind than the square opening. Table No. 7 gives equivalent round openings to match square specifications.

(3) Hexagonal opening. These are offered as a compromise between round and square, having shorter parallel sides for wedging of particles. It should be noted from Fig. 1 that the hexagonal opening has a larger percentage of open area than the round openings at 60 deg. stagger for a given ratio of bar width to opening. For the same width of opening, the hexagonal opening has the same percentage of open area as a square opening. To produce a given size product, say passing 1½ in. sq. opening, would require a 1⅝ in. hex opening to give an equivalent product. Thus, the larger equivalent opening with the same bar width of metal will give a larger open area percentage.

		(Equivalent)
	1½ in. sq.	1⅝ in. Hex
Percentage Open Area	64 percent	66 percent

(Both having ⅜ in. wide bar between openings)

It is generally agreed that perforated plate is not normally recommended for square openings below ¼ in. sq. The perforated plate manufacturers recommend their product very strongly for above ½ in. sq. opening.

Perforated plate on a sloping screen tends to be very smooth and to allow material to slide across it with little interference. This difficulty can be combatted by various corrugating devices developed by the manufacturers. The cheapest method gives the surface an appearance of staggered bumps or mounds to slow down the feed passing across. Another style available is the "waterfall" type of plate.

Type of steel helps determine the abrasive life of perforated plate. Table No. 3 shows a comparison of the different types of plate generally available, including cost data. Fig. 7 shows comparative price data for a given size of perforated plate, namely a 5 x 4 ft. section of ¾ in. square opening. The comparative wire cloth prices are shown for comparison. It is obvious that perforated plate requires a mass production setup with the price per piece dropping rapidly with the increase in quantity. Die setup charges of $20 to $30 must be allocated over the given quantity of plates. The general quantity discount schedule is shown in Fig. 8 along with a generalized price setup at 200 sq. ft. For a given plate thickness the small openings cost more than the larger, and for a given opening the price increases rapidly with plate thickness.

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Table 5. Perforated screen plate thickness and bar width data. Key: (1) If no thickness is specified by purchaser, those indicated are generally furnished for both .20 to .30 C and .30 to .40 carbon steel; (2) for best screen efficiency, plate thickness should not exceed opening dimension; (3) bar width is width of unpunched steel between openings

Square Opening, inches	Plate Thickness Normally Supplied(1) inches, .20-.30 C Steel	.30-.40 C Steel	Maximum(2) Thickness Available, inches .20-.30 C Steel	.30-.40 C Steel	Bar Width(3) Normally Supplied, inches	Open Area for Given Bar Width, percent
1/4	.135 (10 Ga.)		1/4	.104 (8 Ga.)	3/16	33
3/8	.104 (8 Ga.)		5/16	3/16	3/16	44
1/2	3/16		1/2	5/16	3/16	53
3/4	1/4		5/8	1/2	1/4	56
1	1/4		5/8	1/2	1/4	64
1½	5/16		5/8	1/2	3/8	64
2	5/16		3/4	3/4	7/16	67
3	3/8		3/4	3/4	1/2	73
4	1/2		3/4	3/4	5/8	75
5	1/2		3/4	3/4	3/4	76
6	1/2		3/4	3/4	7/8	76

Table 4. Perforated screen plate comparative data. Key: (1) BHN, Brinell hardness number; (2) from information supplied by vendor; (3) obtained only by work hardening

	Type of Steel						
	.20 to .30 C		.30 to .40 C	.35 to .45 C	"A.R." .35 to .50 C and 1.5 to 2.0 Mn		Manganese (Work-Hardening)
	As Rolled	Heat Treated	As Rolled	As Rolled	As Rolled	Heat Treated	
Hardness, BHN(1)							
Initial (2)	120	120	165	190	225	225	200
Final (2)	---	176	---	---	---	270	500(3)
Thickness Limitations	Varies with openings except for A.R. steel which has maximum thickness of 1/4 inch.						
Cost Data	About $.25/ft.² less than Heat Treated	See Fig. 8	See Fig. 8	About 10% higher than .20 to .30 C Heat Treated	About 175 to 200% of .20 to .30 C Heat Treated	---	Estimated at 400 to 500% of .20 to .30 C Heat Treated
	Wear life should be in proportion BHN ratio. Manganese steel, if work hardened in service should have life increased in proportion to BHN ratio.						
Dravo Tests on Hardness, BHN	125	216	155	165	---	---	---
Vendor	X	X	V	V	X	X	Z

Enter 1068 on Reader Card

Has no springs, rides on Hydrair*

— With Haulpak's exclusive air-hydraulic suspension system, you completely eliminate maintenance and repair of springs. 4 Hydrair units cushion against loading and travel shocks . . . keep unit riding level over bumps and holes. LW Haulpak also has exclusive LW power-transfer differential — permits unit to haul over wet, muddy areas that bog down competitive trucks.

You'll haul more tons per hour at lower cost . . . with LW Haulpak®

Low loading height — (only 10'1" on 32-ton size) and large top opening (14'5" x 11') makes it easy to load LW Haulpak *fast*, without spillage.

This revolutionary off-highway truck gives you highest output at lowest ownership and operating costs. You get these profit-making benefits because the all-new, fully-proven LeTourneau-Westinghouse Haulpak is built *specifically* for rugged, heavy-duty hauling. It is not a "beefed-up" highway truck . . . nor does Haulpak have the maintenance problems common on ordinary haulers.

Notice, for example, Haulpak's rugged "V"-shaped body. This exclusive LW design gives you *bonus* yardage within a short wheelbase . . . makes for easy loading . . . and provides a low center of gravity for exceptional stability.

LW Haulpak's short, 130-inch wheelbase gives you unusual maneuverability (makes non-stop U-turn in area only 44'6" wide . . . shortest turning radius of any big off-road truck). You spot, swing around, back up and dump *fast* . . . you eliminate most maneuvering delays, complete faster cycles. You have "feather-touch" power-steer, too . . . system is located high behind bumper, well protected from damage.

And, very important, time lost for maintaining your Haulpak is practically nil. It needs *no* daily lubrication. The entire Haulpak lubrication check — *needed only at 500-hr intervals* — consists of just 4 easily-reached grease fittings. In addition, LW Haulpak's various parts and assemblies — some of them tested and proved by *millions of hours* on LW Tournapulls® all over the world — are much stronger than those used on competitive haulers.

22, 27, 32-ton sizes

Ask us for detailed specifications on the size Haulpak that fits your needs. Available in 22, 27, and 32-ton sizes . . . 290, 335, and 375 hp. Compare its features with any other truck in the industry . . . you be the judge!

*Trademark HP-2155-G-1

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

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Where quality is a habit

Screening surface cont'd. from page 104

Table No. 4 gives data on perforated plate not generally available in catalogs. For a given opening it shows the normal plate thickness and bar width supplied if none is specified by the user. A study of this table seemed to lead naturally to the derivation of Table No. 5. This is a compilation of a proposed standardization of four grades of perforated plate to match the equivalent chart of "Simplified Practice for Wire Cloth" (Table 6). If this or some other standard were adopted, it would give the producer more of a guide to work with in the selection of perforated plate. The medium classification follows rather closely Column 1 ("Normally Supplied Thickness") from Table No. 4. The other columns are developed upward and downward. The use of this proposed Table No. 5 would fill a void in information now available on perforated screen plate.

Even in this brief coverage of a complicated subject, several problems become obvious. First, cloth or plate cannot be purchased like nuts or bolts from a catalog, or on price alone. The more familiar the buyer is with the actual operational details, the better selection he can make. The producer should be constantly experimenting to obtain lower cost screening. Probably the worst possible move is to buy screen cloth or plate, install it and forget it. An imperfect installation can ruin the most expensive material.

A good application engineer is invaluable in making recommendations for proper use of screen surfaces based on his experience. Fortunately, the reputable manufacturers are very much interested in helping the producer to get the most life from his product.

The user should be continually searching for the ideal screen surface which would wear out exactly as the proverbial "one hoss shay." Here, every part was designed exactly as strong as every other and, when it was worn out, everything just disappeared in fragments with nothing left. This is the ideal prescription for screening surface—that the steel abrade away to nothing just as it breaks into pieces from fatigue (assuming the enlargement of the opening is not critical).

It is to be hoped that this collection of data herein will shed some new light. Perhaps it will open the way to additional study for lower cost screening and may help the producer see how to get the greatest value for his dollar in buying screen cloth or plate. **END**

Table 7. Approximate round and square opening equivalents (from Table 5, Dept. Comm. Bul. R-163-36). Key: (1) These hexagonal opening equivalents are supplied by Cross Perforated Metals as the result of actual field experience. They are not included in Dept. of Comm. Bulletin shown

Equivalent Openings, Inches		
Square	Round	Hexagonal(1)
4	4-3/4	4-3/8
3-3/4	4-1/2	4-1/16
3-1/2	4-1/4	3-7/8
3-5/16	4	None
3-1/4	3-7/8	3-9/16
3-1/8	3-3/4	None
3	3-1/2	3-1/4
2-3/4	3-1/4	3
2-1/2	3	2-3/4
2-1/4	2-3/4	2-1/2
2-1/8	2-1/2	2-5/16
2	2-3/8	2-3/16
1-7/8	2-1/4	2-1/16
1-3/4	2	1-7/8
1-1/2	1-3/4	1-5/8
1-1/4	1-1/2	1-3/8
1-1/8	1-3/8	1-1/4
1	1-1/4	1-1/8
7/8	1	15/16
3/4	7/8	13/16
5/8	3/4	11/16
1/2	5/8	9/16
3/8	1/2	7/16
5/16	3/8	11/32
1/4	5/16	9/32
3/16	1/4	None
5/32	3/16	None
3/32	1/8	None

Table 6. Recommended standards for perforated plate of sizing aggregates (proposed by W. L. Price). Key: (*) Gauge

	Light			Medium			Medium Heavy			Heavy		
Square Opening, inches	Plate Thickness, inches	Bar Width, inches	Open Area, percent	Plate Thickness, inches	Bar Width, inches	Open Area, percent	Plate Thickness, inches	Bar Width, inches	Open Area, percent	Plate Thickness, inches	Bar Width, inches	Open Area, percent
1/4	(12 Ga.)*	1/8	45	(10 Ga.)*	3/16	33	(8 Ga.)*	3/16	33	3/16	3/16	33
3/8	(10 Ga.)*	1/8	56	(8 Ga.)*	3/16	44	(8 Ga.)*	7/32	40	3/16	1/4	36
1/2	(8 Ga.)*	5/32	58	3/16	3/16	53	3/16	1/4	45	1/4	1/4	45
3/4	3/16	3/16	64	1/4	1/4	56	5/16	3/8	45	5/16	3/8	45
1	3/16	3/16	71	1/4	1/4	64	5/16	3/8	53	3/8	3/8	53
1½	1/4	1/4	73	5/16	5/16	69	3/8	3/8	64	1/2	1/2	56
2	5/16	5/16	75	3/8	3/8	72	1/2	1/2	64	1/2	1/2	64
3	3/8	3/8	79	1/2	1/2	74	5/8	5/8	69	3/4	3/4	64
4	1/2	1/2	79	5/8	5/8	74	3/4	3/4	71	1	1	64
5	1/2	1/2	83	3/4	3/4	76	1	1	69	1¼	1¼	64
6	5/8	5/8	82	3/4	3/4	79	1	1	74	1¼	1¼	69

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YOUR GRADER—

PRODUCTION TOOL?

...or OVERHEAD?

Chances are, you consider a grader a maintenance tool . . . a kind-of "necessary evil." But is it just that?

Think how a grader keeps haul roads in top-speed shape — thus increasing the number of round-trips your haulers can make daily. Or think of the extra working days you gain because ditches, cut by a grader, let water run off faster.

Objective . . . increased production

The net result of most grader work in mines, quarries, and pits, is higher output . . . increased production. In a sense, the extra tonnage you get — due solely to work of your graders — is really *their* production. It's output you wouldn't get without graders . . . couldn't get without added expense.

So! While your grader may be a "maintenance" tool in function, it is actually a "production" tool in results. That's why you will want to select your graders carefully, on the basis of work-output. You'll want machines that can handle *all* your blade-work *fast* . . . that can help you get the "last ounce" of tonnage with your production equipment.

L-W "660" does more work, faster

You'll find that a big L-W Adams† 660 grader can cut deeper, push more dirt, move it faster than other graders of similar size, price, and power. "660" gives you greater work-output than others — mainly because of its wide selection of power-speed combinations, which let you do more of your work at full engine-power. The L-W grader also provides extra, faster forward and reverse speeds to save you time on traveling, maneuvering, and backing-up for the next cut.

This profit-boosting grader is offered in 2 power options: Standard "660" with 160-hp diesel and constant-mesh transmission, or POWER-*Flow*® 660 with 190-hp engine and torque converter. Five other L-W Adams model graders — 60 to 145 hp — also available.

Call or write for complete information about features that make LeTourneau-Westinghouse machines the most profitable graders you can own.

†Trademark G-1884-MQ-1

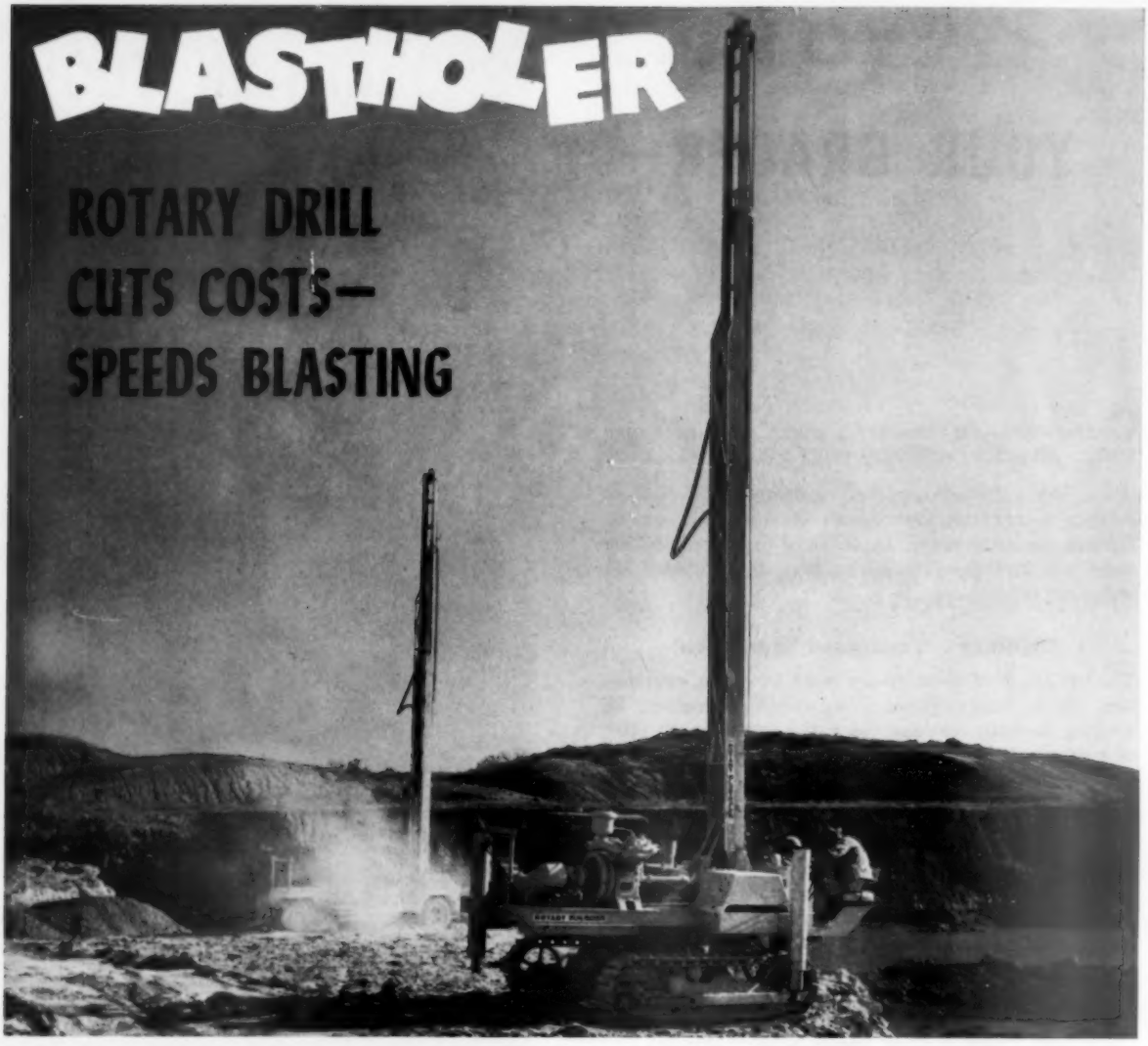
LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

BLASTHOLER

ROTARY DRILL CUTS COSTS— SPEEDS BLASTING



BLASTHOLER

ABOVE: Track and tire-mounted BLASTHOLERS drilling 25′ blast holes without adding steel in a hard limestone quarry.

This self-propelled rotary drill can really start your production on the up-swing — save you money, too! 2 to 5 times faster than other cumbersome equipment, the BLASTHOLER requires only one operator, carries own air for cleaning hole. Standard BLASTHOLER drills 20′ holes 3″ in diameter without adding steel. Optional equipment gives you depths to 50′. BLASTHOLER mounts on tracks or dual pneumatic tires to meet your terrain requirements. Cut costs — speed blasting! See the BLASTHOLER today!

BLASTHOLER DEALERS

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Columbus, Ohio

Reid-Holcomb Co., Inc.
Indianapolis, Ind.

Watson Equipment Co., Inc.
Pittsburgh, Pa.

Ray C. Call Co., Inc.
South Charleston, W. Va.

Illinois Road Equipment Co.
Springfield, Ill.

Williams Tractor Co.
Louisville, Ky.

Hi-Way Machinery Co.
Dallas, Texas

Bublitz Machinery Co.
North Kansas City, Mo.

James W. Bell Co., Inc.
Cedar Rapids, Iowa

Anderson Equipment Co., Inc.
Omaha, Neb.

Wylie-Stewart Co., Inc.
Oklahoma City, Okla.

Wisconsin Drilling & Equipment Co., Inc.
Madison, Wis.

Contractors Machinery Co.
San Antonio, Texas

DRILLING ACCESSORY AND MANUFACTURING COMPANY, INC.
2006 South Industrial Boulevard
Dallas, Texas

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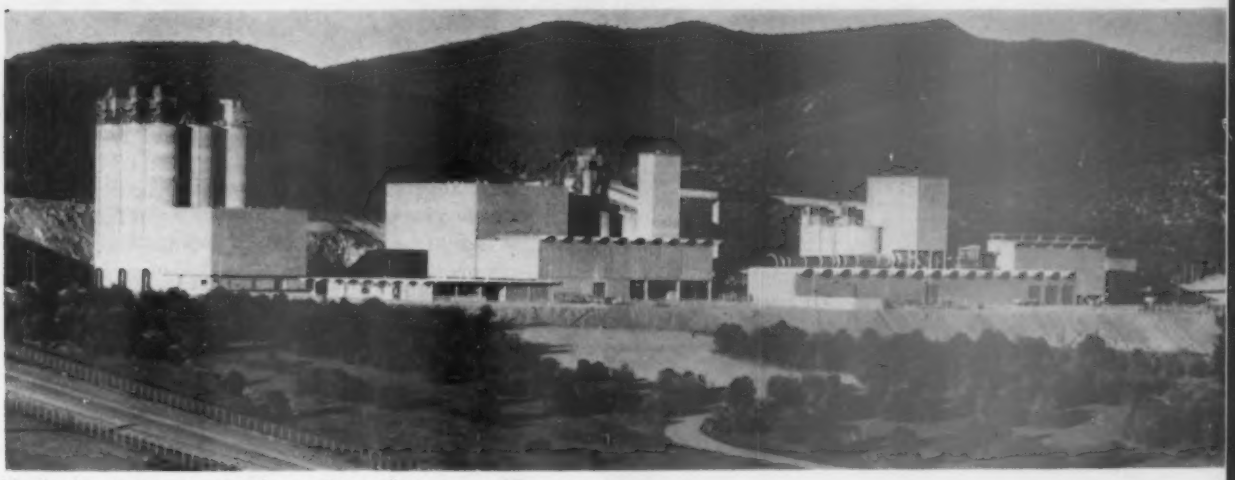


Ideal's gleaming new cement plant in Tijeras Canyon near Albuquerque

This is a section of vast dust collection system which filters and cleans all kiln gases

Ideal dedicates new $14-million plant

AN ADVENTURE IN CONCRETE CONSTRUCTION." "A new concept in cement plants . . ." These were among the enthusiastic comments of those who attended the dedication of Ideal Cement Co.'s new cement plant at Tijeras, N.M., on June 16.

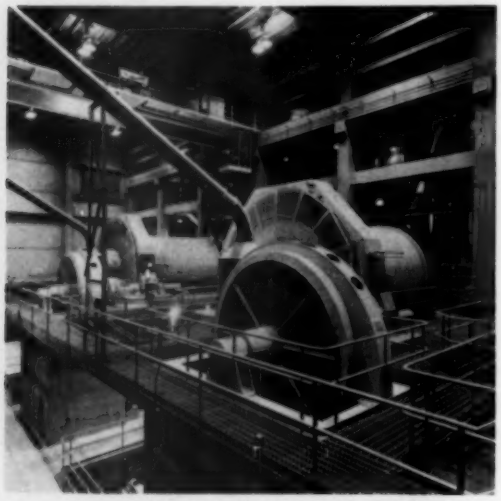
The governor of New Mexico and more than 500 representatives of government, southwestern industry and press attended the formal opening of the $14-million cement plant. First in New Mexico, it is an integral part of Ideal's 10-year, $176-million expansion program. The 1-million-bbl. capacity of the new single-kiln, dry-process cement plant will serve the exceptional construction growth of the central New Mexico area.

Much of the "adventure" in the new plant is the bold use of concrete products in its construction. However, each innovation was chosen only after its practicality, economy and architectural beauty was established.

- Precast, barrel-shell roofs up to 75 ft. long cover much of the structure including the firing room and office building.
- Highly decorative precast mosaic panels are used everywhere. These are made with light-

Please turn page

The control room from which all production equipment is controlled and operated



The raw mill, above right, and the clinker grinding mill, left, are 11 ft. 6 in. in diam. and 17 ft. in length

Left: The 12 x 375-ft. kiln at the Ideal plant slopes ⅜ in. per ft. Temperature inside the kiln reaches 2,750 degrees F.

New plant

continued from page 109

weight aggregates and the exposed, river gravel surfaces gives them exceptional eye appeal.

- All structural sections—beams and columns—are prestressed concrete.
- Fence posts and utility poles throughout the plant area are precast concrete.

Altogether, more than 70,000 cu. yd. of concrete were placed. Of this more than 67,000 cu. yd. were poured in place in the form of foundations and slip-form silos.

Many of the latest developments in cement making efficiency have been included. This is one of the most completely instrumented cement plants in the industry today. Every part of the production process is controlled from a central control station. The control room operator in his air-conditioned room is in full command of all production equipment from the quarry to the pack house. He has banks of communications equipment, controlling and recording instruments at his fingertips.

The new cement plant is in a remote desert location 14 mi. east of Albuquerque, yet Ideal Cement has taken every precaution to avoid dust contamination of the clear desert air and to maintain immaculate housekeeping within the plant. There are no less than 33 dust collecting systems. Most elaborate of these is a bag collector for kiln exhaust gases that eliminates the stack—longtime sign and symbol of a cement plant.

This mechanical dust collector is the largest glass bag installation in the cement industry, possibly the largest in any industry. Kiln exhaust gases at 600 deg. F. are handled by 1,280 glass cloth bags arranged in ten banks of 128 bags each. Half the bags in each bank are collapsed at regular intervals to drop the dust into a steel collecting hopper to be carried away with screw conveyors. Each cylindrical bag is about 11½ in. in diam., 25 ft. long and suspended vertically above the collecting hopper.

Production equipment includes a 12 x 375-ft. kiln, a 6 x 85-ft. vibrating clinker cooler, a pair of 11½ x 17-ft. ball mills with 1,250-hp. motors, and nine silos for finished cement with a total capacity of about 169,000 bbl.

All shipments from the new plant are made by truck, with storage silos and scales arranged to load three bulk trucks at one time. END

INDUSTRY'S ONE-ARMED PROFIT BANDIT

. . . and how Lincoln centralized lubrication can help you beat it!

The oil can symbolizes *all* the outmoded methods of lubrication used in industry today. Modern management is turning more-and-more to automatic *centralized lubrication* to protect its extensive investment in specialized production equipment —but many companies are *still* gambling *and losing* profits by relying on inadequate means of lubricant application.

Lincoln's power lubrication systems automatically apply the *right* lubricant, in the *right* quantity, at the *right* time to every lubrication point, simultaneously while machines are operating. You realize more profit in reduced down-time, longer machine life, increased production and better quality control, plus savings in man-hours, lubricants and power consumption. Why not talk it over with your Lincoln representative?

Write now for your copy of Lincoln's new brochure, "A Report to Management" . . . 16 pages showing in detail how modern lubrication methods can reduce operating costs and improve production.

Lincoln

Coast-to-Coast Sales and Service through 16 Branch Offices and Leading Industrial Distributors

LINCOLN ENGINEERING COMPANY
Division of The McNeil Machine & Engineering Co.
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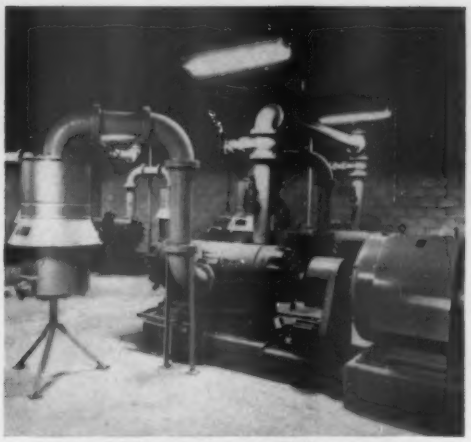
FULLER MATERIALS HANDLING EQUIPMENT HELPS CEMENT PLANT TRIPLE CAPACITY



Group of C-300 single stage Fuller rotary compressors furnishing air for the Fuller-Kinyon pumps in raw-finish department.

Two 10" Fuller-Kinyon pumps in raw mill pumping material to blending silos.

F-H Airslide Conveyor under new finished cement silos feeding to Fuller-Kinyon pump for redistribution.

One of three Fuller Inclined Grate Coolers in kiln building.

Automation with a variety of Fuller equipment at Lehigh Portland Cement Company's Union Bridge, Maryland plant has helped triple capacity from 1,000,000 to 3,000,000 barrels a year.

In this installation, Fuller-Kinyon pumps handle both cement raw material and finished cement to and from process.

Fuller rotary compressors furnish air for both the Fuller-Kinyon pumps and general plant air.

Airslide® Fluidizing Conveyors are used at various stages of both the raw and finished mill operations in feeding both raw material and finished cement to and from process and storage.

Clinker is discharged from three 400′ kilns and cooled to about 145°F. by three Fuller 7′ x 44′ Inclined Grate Coolers.

This wide range of Fuller systems and equipment in the field of pneumatic handling makes it possible for Fuller to find the method of moving dry bulk granular materials best suited to your particular application. Why not write for complete details today? 1324 G-198-T

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....pioneers in harnessing AIR

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Vibrating feeders split the flow of material between the road-base shipping section (left) and the aggregates section (right)

Stacker belt builds surge pile of minus 7-in. granite from primary crusher

The mountain-top quarry of blue granite

A mountain pasture too poor to support vegetation now yields a million-ton supply of aggregates for Clement Bros.

Blue granite challenges road builder

by Elwood Meschter

A GRANITE QUARRY HAS BEEN BLASTED out of a scrubby cow pasture at the top of a South Carolina mountain. Too poor to support vegetation, the 100-acre tract is now yielding a million-ton supply of aggregates for Clement Brothers. They are supplying this material for the segments of the Federal Highway Program which radiate from the quarry at Pomaria.

The granite formation is ideal for this purpose. The rock closely resembles the famous "Carolina Blue" granite, but is harder and more brittle. The heavy rock is sharp and abrasive—very destructive to crushing and screening equipment. The plant setup takes advantage of the steep terrain by handling the rock downhill most of the time. Blasted rock is moved from the quarry face down to the primary crusher; this crusher is high above the rest of the screening and crushing plant.

Capacity of the new plant had been designed for 300 tph., but the original 32 x 40-in. jaw crusher could not break down the quarry-run of large blocks fast enough to keep ahead of the shovel and haulage trucks in the quarry. A new 42 x 48-in. crusher does keep ahead of the three 18-ton, end-dump trucks and easily makes 350 tph. of minus 7-in. stone.

This increase in capacity has stepped up the tempo of quarry work. A truck-mounted dragline makes a level working area for the drills by stripping the red clay overburden down to the top of the granite. This clay is piled well out of the way of the drillers, but it is available for shipment to be used as fill.

A pair of crawler-mounted wagon drills put down 3-in. diam. blast holes to make a 50-ft. face. The crawlers have proven ideal for operation on the rough surface of the exposed granite. The rock formation is heavily seamed and fissured, adding greatly to the difficulties of drilling and of getting good fragmentation in blasting. Blasting is done after 100 to 120 holes have been put down.

In spite of the blasting foreman's expertness and the driller's precautions, a great deal of blocky material is brought down with each blast. Much of this material is crusher-feed size, but there are large blocks that must be broken with a drop ball on a ¾-cu. yd. crane. *Please turn page*

Blue granite challenges road builder *continued from page 115*

Normal operation calls for only two trucks to keep up with the 2½-cu. yd. shovel in the quarry. These trucks keep the primary crusher hopper full above the 3½ x 14-ft., heavy-duty manganese steel apron feeder.

Under the crusher is the foot end of a 36-in. stacker belt which makes a 30-ft. deep surge pile of crushed stone. This pile provides the raw material to keep the screening and crushing plant going during the two shifts the quarry does not operate. A reclaim tunnel with a vibrating feeder under the surge pile takes material out of storage, while a bulldozer pushes rock toward the center of the pile.

First unit in the screening plant is a 5 x 12-ft., double-deck vibrating screen. Oversize from both decks is dropped to a 4-ft. cone crusher which is set at 2 in. and the crusher product is recycled to the top of the screen. Minus 2-in. rock through the bottom deck is dropped to a steel surge bin fitted with two vibrating feeders.

The flow of material can be split right here. A shipping system and an aggregates preparation system can take material and process it independently. Since either system can be altered or expanded, this is a valuable feature of the new plant. One feeder loads a conveyor leading to a truck shipping bin for the 2-in. x 0 product. The other feeder discharges to an inclined belt conveyor for the trip to a crushing and screening section which makes accurately sized products.

Road-base stone is taken out of the truck shipping bin when production exceeds haulage and stored in huge surge pile. A ¾-cu. yd. shovel loads out the more than 50 trucks used by Clement-Dickerson, Inc., prime contractors for a local highway project.

While the overburden was carefully stripped from the rock in the quarry, no attempt is made to take out any more of the stray clay. A small amount of the sandy clay is tolerated in the 2-in. x 0 road-base stone.

Precision sizing of the product in the aggregates preparation section of the new plant begins at the 4 x 8-ft., double-deck, horizontal vibrating screen. Top deck of this unit takes off plus 1-in. stone and drops it to a 4-ft. cone crusher set for 1-in. Crushed granite is recycled to the top of the screen with a belt conveyor system.

Lower deck of the screen takes out 4-mesh x 0 dust and drops it to a truck shipping bin. This

Please turn to page 118

The aggregates preparation system makes either concrete or bituminous aggregates

"MAGNECON" KILN LINERS EXCEL IN THE WORLD OF CEMENT MANUFACTURE

"MAGNECON" has gained international recognition as the leading hot zone refractory for rotary kilns. "MAGNECON" brick is a strong, dense basic refractory with high spalling resistance, low thermal conductivity and excellent resistance to chemical and abrasive attack. It is outstanding in its ability to acquire and hold a protective coating. It is made from Canadian magnesite with chrome ore under exacting chemical and physical controls.

"MAGNECON" BRICKS are now available with steel plates and cardboard spacers. Plates are keyed to the brick to prevent slippage.

CANADIAN REFRACTORIES LIMITED

CANADA CEMENT BUILDING, MONTREAL, CANADA

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Blue granite challenges road builder *continued from page 116*

fraction has all of the clay fines as well as crusher dust.

The 1-in. x 4-mesh product of the lower deck is conveyed to another screening station where another horizontal vibrating screen splits it into two products, 1 x ½ in. and ½ in. x 4 mesh. Each size is dropped into a compartment in the steel bin under the screen. Spray pipes on the screen scrub the stone to remove dust when aggregate specifications require washed stone.

An ingenious arrangement of vibrating feeders under the bin gives unusual flexibility to the shipping operation. The bottom of each compartment has a small vibrating feeder; the two feeders discharge to a single 30-in. wide belt conveyor leading to a truck shipping bin. Each feeder can be controlled to give a specified amount of granite rock from each bin, tailoring the blend of material to meet specifications.

The strategically located vibrating feeders give Plant Manager J. F. Clement great production versatility. The speed of each feeder can be varied. This permits each piece of production equipment to work close to maximum capacity or, conversely, permits the flow of material to be throttled down to keep pace with slower shipping schedules.

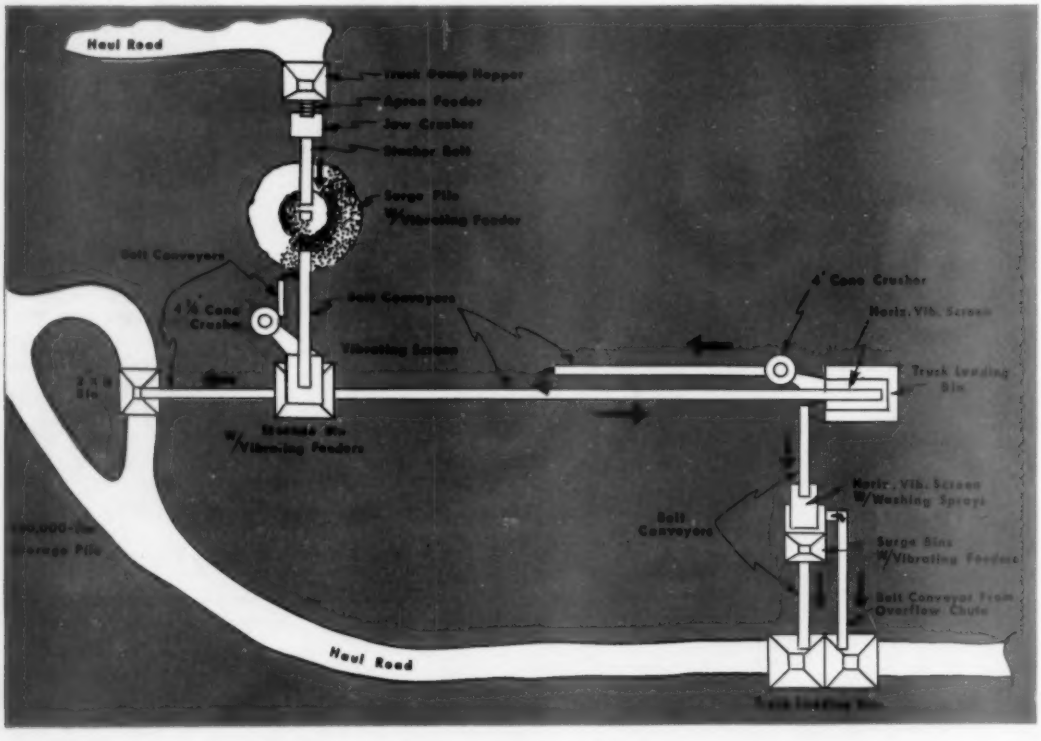
Additional flexibility is achieved with an overflow spout on the ½-in. x 4-mesh compartment. When the gate is opened, material flows to a 24-in. wide belt conveyor to load a truck shipping bin.

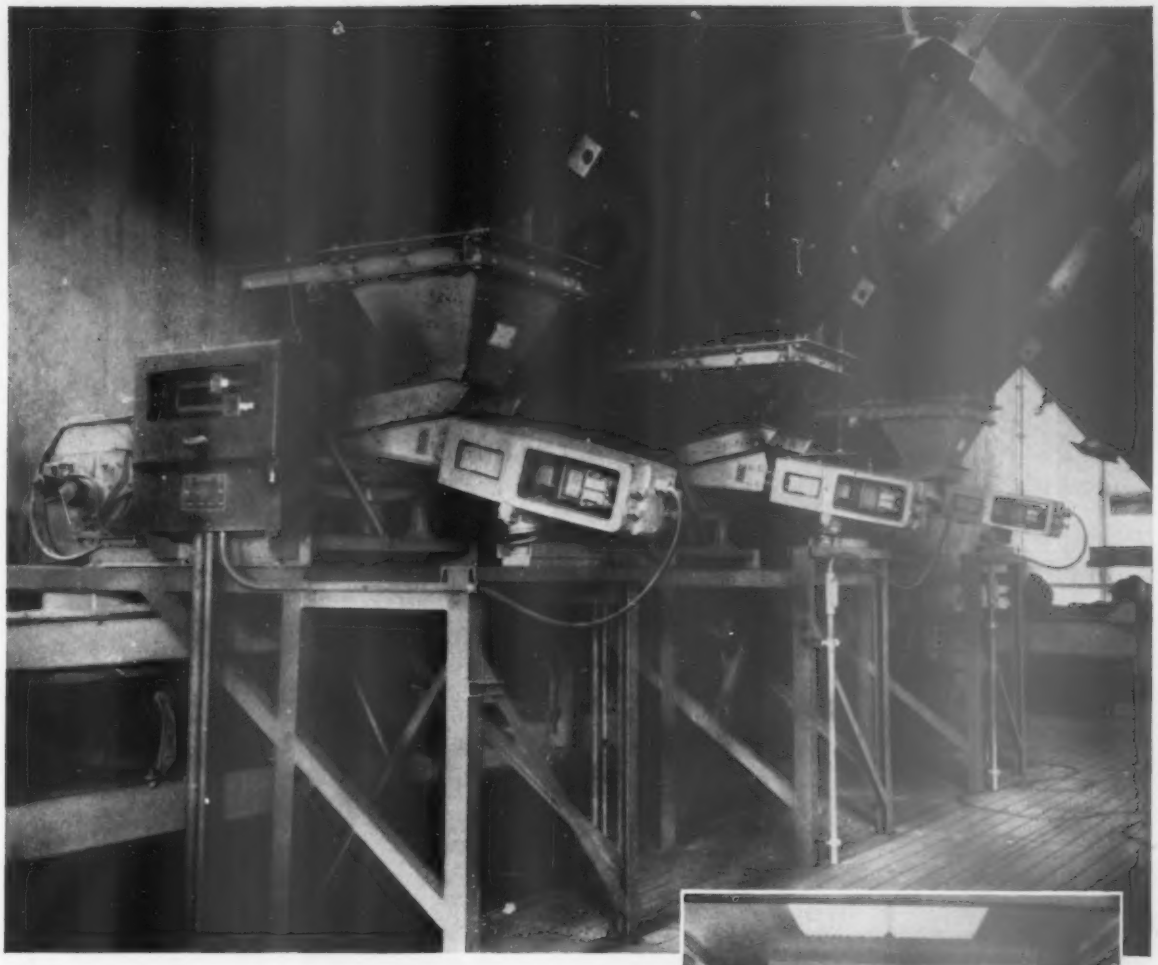
Mr. Clement feels that the horizontal vibrating screens give him additional economy. The horizontal arrangement makes it easy for his crew to change screen cloths quickly when size specifications are changed.

At the moment, there are no plans to expand the mountain-top quarry to bench operation. Existing orders will scarcely make a dent in the top of the granite formation at present levels. **END**

MAJOR EQUIPMENT REFERENCE

Drills and compressor	Ingersoll-Rand Co.
Shovels (2), ¾ x 2½-cu. yd.	Northwest Engineering Co.
Mobile dragline, 1-cu. yd.	Koehring Co.
Dropball unit, ¾-cu. yd.	Lima Construction Equipment Div., B-L-H
Trucks, (3) 15-ton	Euclid Div., GMC
Apron feeder 3½ x 14-ft.	Iowa Manufacturing Co.
Jaw crusher, 42 x 48-in.	Iowa Manufacturing Co.
Vibrating screens, 5 x 12-ft., 4 x 8-ft. horiz.	Iowa Manufacturing Co.
Vibrating feeders (5)	Syntron Co.
Cone crushers, 4¼-ft. and 4-ft.	Nordberg Mfg. Co.
Shipping scale, 30-ton	Winslow Government Scale Co.





Jeffrey WAYTROLS® automatically proportion and feed raw materials

In this new cement plant, an automatic system incorporating Jeffrey WAYTROLS proportions and feeds raw materials. This permits mill operators to vary the rate at which the blended product is fed through process to suit requirements.

Jeffrey WAYTROLS can be used in many processes . . . can contribute to your plant efficiency. Where slurries or slimes are involved, WAYTROLS can provide accurate mix and fast low-cost processing. If just solid content is important, instruments can measure it and ignore water content.

For information on how Jeffrey processing equipment can help you, write The Jeffrey Manufacturing Company, 935 North Fourth Street, Columbus 16, Ohio.

These units (upper photo) are part of a group of 10 WAYTROLS in a new cement plant. Automatic controls (below) regulate raw feed ratios and control proportioning of materials.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT...TRANSMISSION MACHINERY...CONTRACT MANUFACTURING

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This rebuilding was done for Continental Mineral Processing in a job shop, but the same technique and equipment can be used by other producers

Hardsurfacing helps restore grinding mill

AUTOMATIC SUBMERGED-ARC HARDSURFACING with mild steel wire combined with alloy flux is put to profitable use in the rebuilding of large, vertical, four-spindle grinding mills for the Continental Mineral Processing Company, Sharonville, Ohio. This rebuilding was done in a job shop, but the same techniques and equipment can be used by other producers.

The mills are used to grind the minerals rutile and zircon, which are basic ingredients of welding electrode coatings and agglomerated submerged-arc fluxes. Essentially, the mills consist of large-diameter rings or shells, inside which the four spindles carrying the grinding rollers are positioned. Both rollers and rings must be hardsurfaced to withstand the heavy wear. In a recent rebuilding job, it was decided to buy a new outer ring of SAE 1035 steel and surface the inside, rather than to try resurfacing the old, worn ring. The element is of 1⅜-in. plate, 8⅞ in. wide, with a diameter of 47 in. on one side and 46 in. on the other to give a slight taper.

A standard automatic welding head, mounted on a horizontal rail, was arranged through rack and pinion to travel in and out of the ring. This ring was set up vertically and driven through motor and speed reducer, so that a continuous bead could be deposited around the inner surface. The head indexed out 5/16 in. after each circumferential pass. Flux retaining rings 1½ in. wide and ¼ in. thick were tack-welded on the outer edges of the ring to contain the flux on the edge pass and to permit running the bead clear out to the edge of the ring.

A mild steel L-60 welding wire was used in conjunction with H-560 alloy flux. This has an agglomerated material containing carbon, manganese, silicon, chromium and molybdenum in sufficient quantity to alloy with the welding wire and produce a deposit with high hardness and exceptional abrasion resistance.

Current setting on the welding head was 400 amp. at 31 arc volts, electrode negative. Travel speed of the ring was 28 in. per min., and two complete passes were made across the surface to give a deposit about ¼ to ⅜ in. thick. To finish the job, the two flux retaining rings were burned off, and the face was ground smooth.

Continental Mineral Processing Co.'s rebuilding work is done by General Tool Co., Reading, Ohio. A Lincoln Electric Co. field engineer was a consultant on the welding aspects of the problem, but the mechanical setup and the techniques of the job were devised by Continental. END

Smooth, uniform appearance of hardsurfacing deposit is characteristic of automatic process. Mild steel wire is used in combination with alloy flux

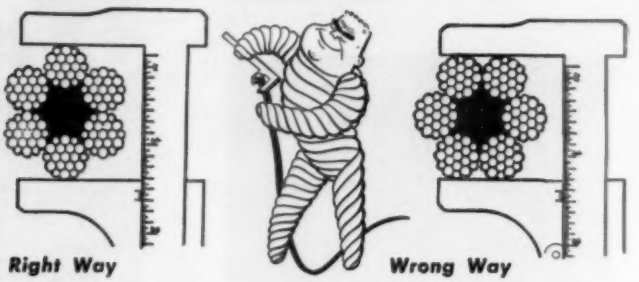
Outer ring of grinding mill is set up on powered positioner to be rotated under welding head for hardsurfacing the inside

Close-up of hidden arc welding being laid down on inner surface of the ring. The welding head traverses outward 5/16 in. after each circumferential pass

Tuffy® Wire Rope Tips

When Sheaves, Sockets and Clips Misfit... Your Pocketbook Will Be Hard Hit

How to Measure Rope Diameter



To get the most service, efficiency and safety out of wire rope operation, rope and sheaves must be precisely fitted to each other. There's only one right way to measure rope diameter: use machinist's calipers and be sure to measure the widest diameter.

A slight shift of the rope in the calipers, as shown above, will give you a misreading which would result in ordering an undersize rope. Note that the measurement at right shows ⅛" under correct diameter. Be sure to double-check every time!

Tuffy Balanced Dragline Rope

Here's highest abrasive resistance with super flexibility. Better spooling. Smoother riding on grooves. And Tuffy Dragline Rope hugs the drum when casting for full load. Gives you longer service life, consistent dependability, in handling any material — wet or dry dirt, sand, gravel, rock, cement or minerals.

How to Check Groove Diameter

No Go

Just Go

Groove diameter of a sheave or drum must never be less than the actual calipered diameter of the new rope. When a new rope is installed on old equipment, use a reliable groove gauge to make sure the tread or bearing surface of all sheaves is of sufficient size to avoid pinching the rope.

Kick Out Worn Sheaves

Old sheaves may never die, but in "fading away" they develop conditions which shorten rope life. Sheaves with grooves corrugated with rope lay impressions should be replaced with new ones before new wire rope is installed.

How to Measure Tread Diameter

Easy, and important. Select the smallest sheave or drum to be used with the new wire rope, and measure actual diameter at lateral center (shortest dimension) of tread.

Tuffy Balanced Slings & Hoist Lines

"Balanced" because they combine strength, flexibility and toughness in the proper relationship to do a better job longer.

Tuffy Slings and Hoist Lines are a top-performing team in every type of materials handling. The slings are made of a patented, machine-braided fabric that's next to impossible to knot or kink. The hoist lines are a special construction in which strength, flexibility and toughness are balanced.

Tuffy Balanced Scraper Rope

"Balanced" construction makes it flexible enough to withstand sharp bends, yet stiff enough to resist looping and kinking when slack. Also gives higher resistance to the shock of load impact on slack line. Moves more yardage per foot because it's specially built to take the beating of drum-crushing abuse.

Tuffy Balanced Dozer Rope

Built to give you longer service with less downtime. Mounted on your dozer, a 150′ reel of ½" or 9/16" can give you a big bonus of extra service. Here's how: when rope shows drum wear or is crushed on the drum, you feed through just enough to replace the damaged part. You save the 40 to 50 feet ordinarily thrown away. Also available in 300′ and 500′ reels.

Use the Right Fittings

Right fittings add life expectancy to wire rope. Fittings which derive holding power from crimping action are harmful.

Shown here is a clamp that has no "wrong side"—can be put on either way. It snugly saddles the rope, grips larger surface area in such a way that loads are carried almost entirely by friction instead of crimping action. Combined in its two parts is a thimble. The parts are interlocked to prevent collapse of the thimble and eliminate all shear on the bolts.

Recommended sizes:

Diameter of Rope	Min. Dia.	Max. Dia.
¼-⅜	+ 1/64"	+ 3/32"
⅜-¾	+ 3/32"	+ 1/16"
⅞-1⅛	+ 3/64"	+ 3/32"
1¼-1½	+ 1/16"	+ ⅛"
1⅝-2¼	+ 3/32"	+ 3/16"
2⅜ and larger	+ ⅛"	+ ¼"

New ropes are usually over-size. It is advisable to have groove diameters of sheaves or drums as large as the actual calipered diameter of the new rope, or slightly larger. We recommend sizes as above charted.

9 Steps to Correct Socketing

1. Securely seize and serve with soft wire ties before cutting, and have at least two additional seizings placed at a distance from the end equal to the length of the basket of the socket.
2. When the rope is properly seized, take off the end seizing. Cut the fiber center back to the seizing, as shown in 1 above. Untwist and broom out the wires. See illustration 2.
3. Clean the wires for the distance they are to be inserted in the socket. Use benzine, naphtha, gasoline or other solvent. Then wash off in boiling water or boiling ammonium chloride used in Step 5.
4. Then dip cleaned wires in commercial muriatic acid to a depth not greater than ¾ of the cleaned length of wire. Keep the wires immersed for 3 minutes, or until the acid has thoroughly etched each wire. Be sure acid does not contact any other portion of rope.
5. Immerse wires into boiling ammonium chloride. A white coating will be left on the wires.
6. Place a temporary tie wire over the ends of the cleaned wire (see illustration 3). Be careful not to get the cleaned wires greasy or oily.
7. Insert the rope end into bottom of socket. Remove temporary tie wire.
8. Holding the rope vertically in a vise, set the socket so that the wires are flush with top of the socket basket and seal the bottom with putty or clay (See illustration 4). Pour in among the wires about ½ teaspoon of sal ammoniac crystals.
9. Pour molten zinc into the basket until it is full (see illustration 5). When zinc is solidified, the seal is removed and socketing complete as shown in illustration 6. The zinc must not be too hot or it will anneal the wires, particularly of small ropes. Temperature must not be above 925° F. Use pine stick test: if stick chars but does not ignite, the zinc is ready to pour. Overheated zinc will have a red color and stick will catch fire. When zinc has solidified sufficiently, the socket may be plunged into cold water.

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Over-all view shows the two portable plants (center and right), tall mast of slackline cableway, and truck-mounted diesel power-

A novel side-by-side arrangement of crushing and washing portables, plus the entire plant's portability, enable Connolly Construction Co. to meet Interstate time and specification requirements

plant. Road-base product is piled in foreground

Portables prove worth on Interstate job

"I'LL BET YOU'VE NEVER SEEN A LAYOUT like this," plant superintendent Ray Carter said. His visitor agreed. Mr. Carter, of Connolly Construction Co., Marysville, O., had two big portable plants—washing and crushing—working in tandem to make 200 tph. of all-crushed road base material for a big Interstate project near Columbus.

The 70,000-ton job was carried out as a subcontract for a gravel firm which needed help in meeting contract deadlines, and the full portability of Connolly's equipment made it possible for them to meet the obligation. Crews worked two shifts much of the time to finish the job by the middle of June, roughly five weeks after they set up shop.

"We made the best possible use of the equipment at hand and came up with this flow diagram," Mr. Carter noted. Here's how the setup works, briefly. The 200-tph. flow of pit-run was sent to a 3 x 6-ft. scalping screen. The scalper shunted minus 1¾-in. material off to the washing plant, set to one side and parallel with the crushing plant. Plus 1¾-in. gravel moved straight ahead to the big twin-crusher portable. This oversize was cleaned on a washing screen, then reduced to minus 2 in. in a jaw crusher.

The minus 1¾, meanwhile, was thoroughly scoured in a rotary scrubber, then rinsed on a vibrating screen. Now fully cleaned, the ⅜ x 1¾-in. gravel moved by belt back to the crushing plant where a roll crusher made the fines specified by reducing the fraction to minus ⅜ in. Since the contract called for an all-crushed material, minus ⅜-in. pea gravel and sand was piled off to the side. These natural fines were stored in two piles, sand

Please turn page

Big crushing plant, heart of the operation, has 1036 jaw and 3025 roll crushers to make the all-crushed road-base product. Note supporting jacks

The two big portables sit side by side. Belt in rear carries washed ⅜ x 1¾-in. gravel back to roll crusher. Stockpiling belt, foreground, for pea gravel uses hydraulic lifts as supports as well as means of adjusting height

Portables

continued from page 125

and pea gravel, and sold as side-line items to the main 70,000-ton job.

Equipment used in the two portables was well matched to the job. The crushing plant had a 4 x 10-ft. 2½-deck washing screen, 1036 jaw crusher and 3025 roll crusher. The washing plant had a 60 in. x 10-ft. scrubber, 4 x 14-ft. twin-deck washing screen and twin 25-ft. sand washing and dewatering screws.

By using this setup, Connolly came up with a material meeting the following specifications. The all-crushed road-base material called for is termed B119 by the Ohio state highway department. It must contain:

Screen opening	Percent passing
2 in.	100
1	70—90
¾	50—85
No. 4	25—60
No. 40	10—30
No. 200	3—10

Wash water was readily available—a large pond had formed beside the plant as a result of excavating the pit-run material. Sections of steel pipe were bolted together to supply the water; a pump set beside the pond did the work necessary.

"Portability puts us in an excellent position to take advantage of the booming highway business," Mr. Carter notes. "We can set up in about three days," he explains. This saves crucial downtime during the busy summer building months when every producing day adds to output and profits.

Even Connolly's 190-hp. diesel power plant for the crushing plant is fully portable—it's mounted on a separate truck chassis. In fact, just about the only thing in the plant not on wheels is the crawler dragline which feeds the operation. To speed setting up at a new location, it is often found unnecessary to block up the big portable plants. Leveling jacks on each rig, resting on heavy planks, do the job.

Mr. Carter added that portables are often a "must" to permit producing aggregates economically for the largely rural Interstate jobs. Producing from a pit near the highway job minimizes haul costs of finished product and gives portables a big advantage, especially where no stationary plants are located nearby.

Too, the two Connolly Construction Co. portables can go right to the deposit—in that case, a big surge pile replenished by a slackline cableway excavator. This means Connolly eliminates labor and equipment cost of two or three haulage trucks, an important cost item.

What do you do in the more typical case, where you're working against a pit face? The company has made its own portable conveyors, can use them to bridge the distance to the plant. Once set up, they require no labor except periodic inspection and lubrication. When the pit face has receded a considerable distance from the plant, the portables can be moved closer and be ready for operation in just three days.

Please turn to page 128

Knuckles right down to any job!

This rugged heavyweight asks no quarter, it just wades right in and polishes off tough hauling jobs. Two high-capacity "live" rear axles give it better flotation and traction on soft ground. And its 234-hp. engine, with dual carburetors standard, gives this T900 tractor the big-chested power to handle the big hauling jobs without tiring.

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Portables prove worth on Interstate job

continued from page 126

The portables are efficient from the labor-cost standpoint, too. Normally a crew of three men can handle all details in operating the two-portable setup. The dragline operator, plus two men to oversee the two plant units are the only men required. Mr. Carter contrasts this with a stationary plant he's seen which requires nine men to produce the same output (200 tph.). Part of the reason Connolly can work with so few men, of course, is that haulage-truck drivers have been eliminated.

Profit-boosting ideas save money and add flexibility to the Connolly portable operation. For example, superintendent Carter points out that their 1-cu. yd. excavator mounts a 1½-cu. yd. dragline bucket. The switch in bucket sizes has boosted production by almost 50 percent and at nominal cost. Mr. Carter reports the excavator handles the load easily on a 60-ft. boom. The plant's portable stockpiling conveyors are another example of the firm's thinking on equipment design. As with other equipment here, the conveyors are mounted on wheels. Second, a hydraulic lift arrangement doubles as the support for the head (discharge) end of the conveyor and as a device for raising or lowering the end. The design gives a simple structure at lowest possible cost. Too, it means the belt can be raised easily to make big stockpiles, or lowered to pass under obstacles when moving.

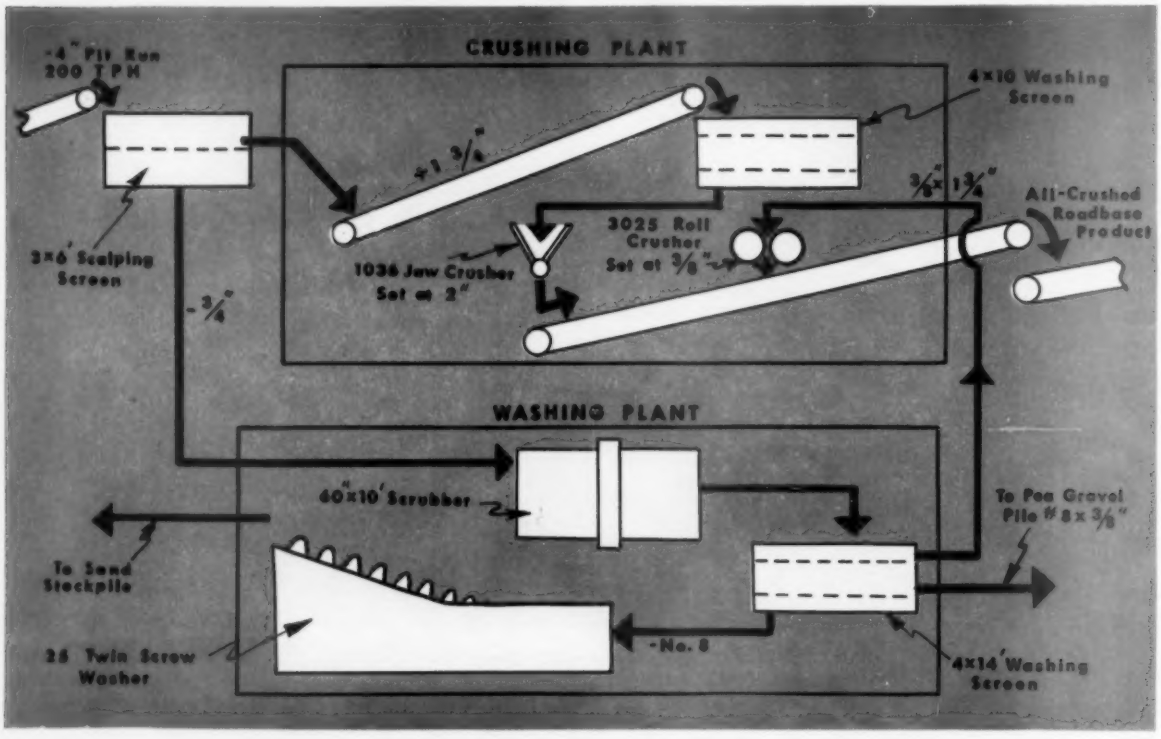
The purely structural elements of each conveyor were made in Connolly's shops. In this way, the company was able to put its repair and metalworking facilities to very good advantage. Of course, it did have to purchase electric motors, drives, idlers and belts.

A final clever use of equipment in the plant: The plant's office and tool shed is a used school bus, converted by removing most of the seats. There's plenty of floor space with the seats out, and still room for the crew to sit. And, of course, the bus is fully portable.

END

MAJOR EQUIPMENT REFERENCE

Crawler dragline, 1½-cu. yd., Model 30-B	Bucyrus-Erie Co.
Scalping screen, 3 x 6-ft.	Simplicity Engineering Co.
In the crushing plant:	
Crushing plant (Commander) design, construction	Iowa Mfg. Co.
Screen, 4 x 10-ft., 2½-deck	Iowa Mfg. Co.
Jaw crusher, 1036	Iowa Mfg. Co.
Roll crusher, 3025	Iowa Mfg. Co.
Power plant, D17000	Caterpillar Tractor Co.
In the washing plant:	
Washing plant (Wash-All) design, construction	Iowa Mfg. Co.
Rotary scrubber, 60 in. x 10-ft.	Iowa Mfg. Co.
Washing screen, 4 x 14-ft., twin deck	Iowa Mfg. Co.
Fines washer & dewaterer, 25-ft., twin-screw	Eagle Iron Works



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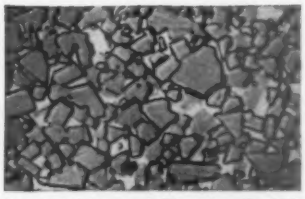

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SHOULDER	TAPER	x	x	x	x													
	F		x	x														
	113		x															
	H			x	x	x	x	x		x								
	115			x	x													
	D						x	x	x	x	x	x	x	x				
	K													x	x	x	x	
BOTTOMING	1" Rope				x	x	x	x		x								
	1¼" Rope						x	x	x	x		x		x				
	400						x	x		x		x						
	1½" Rope											x	x	x	x	x		
	600											x	x	x	x			
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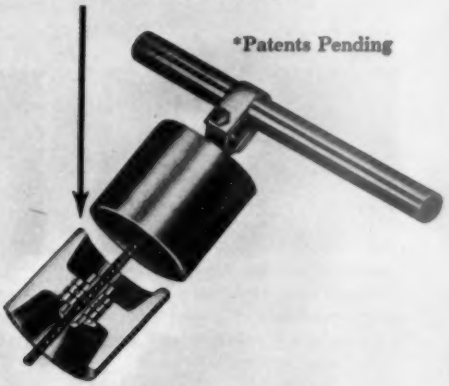

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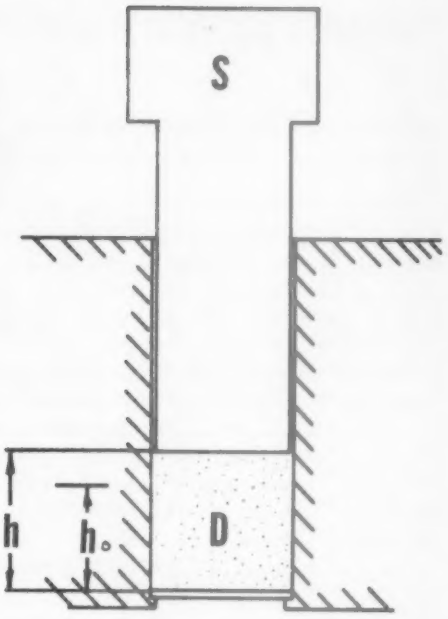

Figure 1. Schematic representation of the measuring method. S = stamp; D = permeability cell; h = effective high of the powder bed; h_o = constant high

By comparing the porosity of a cement powder bed with its permeability, a practical formula has been derived

How to measure super-fine powders

*by Dr. W. Wieland**

A FORMULA HAS BEEN FOUND which satisfies the requirements of the porosity and the additive property of surface areas in the range of 200 to 12,000 cm.²/g. for cement. This can be stated as (11):

$$S_v = C \left[t_r \cdot e^{a'(E_o - E)} \right]^{1/6}$$

in which S_v is the ratio of the surface of a particle to its volume; C is a constant; t_r is the reduced time for powder beds of the constant height, h_o; e is the natural logarithm; a' is 2.303 times a, a constant for the material; E_o is a constant porosity; E is a specific porosity.

The knowledge of surface properties is of exceeding importance to the manufacturer of cement. As a rule, the problems of grinding progress and hydration are solved by the applications of the Blaine apparatus or by similar appliances. In practice, this method of measurement is satisfactory as a routine test for continuallly checking the grinding process.

When extremely fine powders come into question, there are different opinions concerning the adaptability of the permeability method of measurement.

Theoretical and experimental investigations of the semi-empirical equations and the formula of R. L. Blaine produced the following results:

—The specific surface for a powder, according to R. L. Blaine, depends on the porosity of the powder bed.

—The additivity law for surface areas calculated for a powder mixture, according to Blaine, is not realized.

—Up to a specific surface of 3,000 cm.²/g., the Blaine formula satisfies the demands for control purposes in cement grinding work.

—For Blaine values higher than 3,000 cm.²/g., the specific surface begins to depend upon the porosity.

By comparing the porosity of a powder bed with its permeability, a perfectly empirical formula was derived, stating the independence of the specific

Please turn to page 132

**Extracts from a paper which appeared in "Zement-Kalk-Gips." Dr. Wieland is a member of the staff of Centre Technique Holderbank, headquartered in Switzerland.*

Measure powders cont'd. from page 131

surface from the porosity within the examined range and fulfilling, at the same time, the additivity law.

This can be stated as (8): $\log t_r = aE + b$, where t_r is the reduced time of flow through powder beds of the constant height, h_o; a is the constant of the material; b is the degree of fineness characterizing the powder; E is the porosity of the material.

The Blaine formula contains no statements with respect to the degree of compactness of the powder bed. In order to avoid the possibility of serious errors when using the Blaine apparatus, the weight of cement powder should always be 2.7 g. Hence, for a mean specific weight of 3.16 cm.³/g., the porosity E will be = .5485.

According to the American specification, the weight of the powder must not be kept constant; but the porosity should be .5 and .53 for normal and fine cement, respectively. These are equivalent, if the specific weight remains constant.

In practice, any cement having a specific surface of 2,500 to 4,000 cm.²/g. (Blaine) can be examined in this manner. However, an additional error has to be taken into account due to the formula for specific surfaces greater than 3,000 cm.²/g., although this will have a minor influence on the results of measurements.

For coarser or finer powders, these prescriptions are limited by the following circumstances: fine powders cannot be compacted to a porosity of .55 (see Fig. 3); for coarse powder, the packing becomes too loose for a permeability of .5, and the relationship (8) is no longer valid (this difficulty is overcome by making the powder as compact as possible).

The principle of the perfectly empirical permeability equation is given by equation (8). For the present time, the linear relationship between log t_r on one side and E on the other side cannot be interpreted. So long as no clear explanation is found, it is a matter of question whether a strict linearity or a good approximation has to be dealt with.

There are limits to the validity of the empirical law (8). When considering the applicability of the equation, the following statements have to be borne in mind:

—A powder bed cannot be compacted at random without destroying the particles.

—A packing cannot be built up loosely at random as the particles will always have a tendency to lie on each other due to gravity. Even though gravity did not exist, the particles would be blown away by a current of air, thus leaving their original location.

If we examine equation (8), we obtain the following extreme conditions: $E \to 1$; $b \to \infty$; $t_r \to \infty$.

If E = O, the permeability cell would be completely filled with a single body. A discussion is therefore superfluous, as equation (8) does not define 'a' and as it is merely valid for powders.

After succeeding in characterizing a powder bed by the two quantities 'a' and 'b', employ them in connection with t and E for the determination of the specific surface.

A comparison of different powder beds is only possible for the constant porosity E_o. From (8), it follows for the general case: $t_r = e^{a'+b'}$, where $a' = 2.303 \cdot a$, and $b' = 2.303 \cdot b$; for the porosity E_o, $t_{ro} = e^{a_o' + b'}$.

a′ and b′ being constant for the same sort of

Please turn to page 134

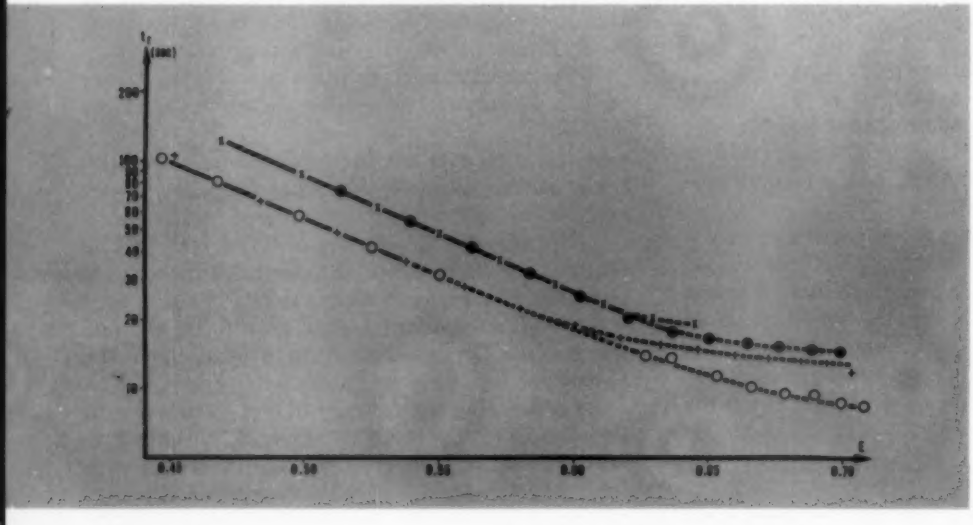

Figure 2.
Time of flow in function of porosity.
● × Empa-Standard cement,
○ + Holderbank-Standard cement

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Modernizing toward *profitable production* differs from plant to plant. In some plants it calls for starting from scratch with a complete replacement of equipment. In other operations, the answer lies in supplementing existing equipment and/or developing a more efficient flow. In all cases prime consideration should be given such factors as reduction of fuel consumption, power demands, maintenance.

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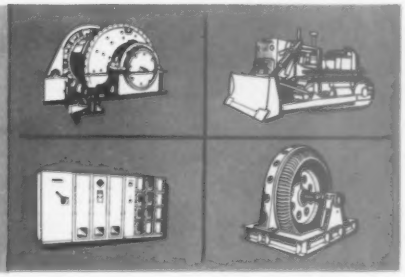

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Measure powders cont'd. from page 132

powder, we can write (9): $t_{eo} = t_r \cdot e^{a'(E_o - E)}$. If we examine clinkers or cement, only a' will remain constant.

The surface area to be estimated has to comply with the following conditions:

—Independence from porosity of powder bed.

—Mixture of powders should obey the summation law

$$S_v = \sum \frac{S_{vi}}{k_j}$$ where k_j — ratio of volumes.

These conditions are satisfied by the relation (10): $S_v = C(t_{eo})^{1/2}$; substituting (8): (11)

$$S_v = C \left[t_r \cdot e^{a'(E_o - E)} \right]^{1/2}$$

The influence of the form factors and the particle size distribution can hardly be realized by theoretical considerations. The conditions of flow of the medium flowing through the powder bed will not be known in detail. Efforts were made to establish an empirical formula satisfying the prevailing requirements.

Method of measurement by the Blaine apparatus (Fig. 1): A sample of cement of 3.5 g. is filled into the permeability cell D; by means of a stamp S, the powder bed is compacted step by step, measuring at the same time for each height of the bed h, the time of flow t as a function of the porosity of the powder bed. The time is determined as usual by taking the mean of three time measurements.

For the evaluation, the following corrections have to be considered:

—Dummy test: The powder bed is limited at the top and at the bottom by two filter papers. Their influence on the time of flow is particularly remarkable for coarse-grained powders, thus simulating a lower permeability. In order to equalize

Table 1—Comparison of both values for the surface areas for separated fractions

Sample	Grain Size	Sv by C_{Empa} cm.$^{-1}$	Sv by C_{spores} cm.$^{-1}$	Diameter of sphere μ	Sv of the spheres x 1,000 cm.$^{-1}$
9001	0 - 2	49,960	38,286	1 - 2	60 - 30
9002	2 - 4	24,680	18,913	2 - 4	30 - 15
9003	4 - 6	23,384	17,920	4 - 6	15 - 10
9004	6 - 8	16,557	12,688	6 - 8	10 - 7.5
9005	8 - 10	13,926	10,672	8 - 10	7.5 - 6.0
9006	10 - 12	11,605	8,893	10 - 12	6.0 - 5.0
9007	12 - 14	8,433	6,462	12 - 14	5.0 - 4.3
D_1F_2	0 - 5	38,916	29,822	1 - 5	60 - 12
D_2F_2	2 - 10	17,562	13,458	2 - 10	30 - 6.5
D_3F_1	3 - 20	5,957	4,565	3 - 20	20 - 3.0
D_3F_1	35 - 50	2,437	1,868	35 - 50	1.7 - 1.2
D_3F_2	50 - 70	948	726	50 - 70	1.2 - 0.8

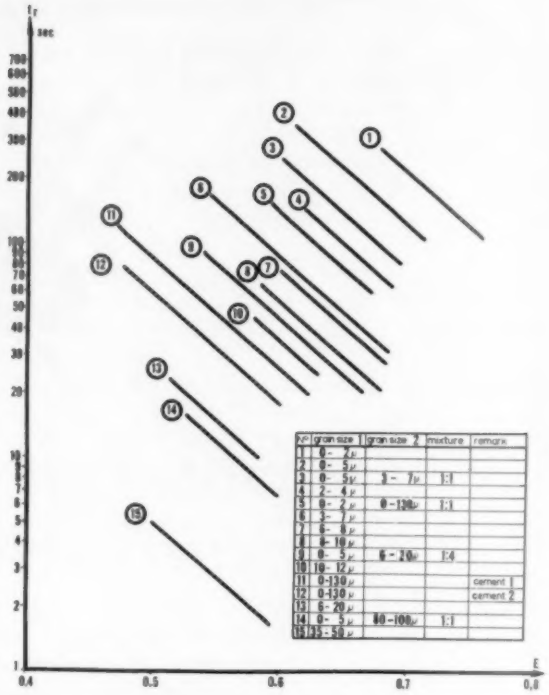

Figure 3. Time of flow in function of porosity for diverse fractions and mixtures

deviations in diameter and quality of the filter discs, the permeability of 10 discs was determined. For two discs, the time of flow $t_o = 4.6$ sec.

—Reduction to the virtual height, h_o: It must be possible to compare the times of flow with each other. Hence, it becomes necessary to reduce the times of flow for powder beds of the constant height h_o. The reduced time, t_r, is given by the relationship: $t_r = \frac{h_o}{h} \cdot t$.

Taking into account the influence of the filter disc, we obtain: $t_r = \frac{h_o}{h}(t - t_o)$.

Based on the method described, 25 different cement and clinker samples were examined. For the representation of the function $e = f(t_r)$, a logarithmic t_r -e diagram was employed. Fig. 2 shows the time of flow as a function of the porosity for a Holderbank cement and for a standard 'Empa-cement, a standard cement of the Swiss Federal Laboratory for Testing Materials and Research. The measurements for each curve were performed twice. Fig. 3 is a synopsis containing all characteristics. For the sake of clearness, the points of measurements were omitted when plotting the various curves.

Referring to Fig. 2 and 3, the following statements can be put forward: *Please turn to page 136*

New ROM vibrating screen

Shakes off brutal battering

...is handling 1000 tph of 48-inch limestone

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There's an Allis-Chalmers screen for every rock products application

A complete line of inclined screens for scalping, specification sizing, washing, rinsing, plus the headroom-saving *Low-Head* horizontal screen for heavy media recovery.

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Measure powders cont'd. from page 134

—Beginning from a certain porosity, depending on the properties of the material, the function e = f(t_r) in the log t_r -e diagram is a straight line.

—For the cement and clinker samples investigated, these straight lines are parallel, obeying the equation (8).

Fig. 2 shows that for loose packing of the particles, the points of measurements do not lie in a straight line. Furthermore, the measured values of both test series performed with the same powder example fail to agree with each other. This divergence of the measured values points to the fact that for an insufficiently compacted powder the packing is not homogeneous where there are agglomerations of particles and larger pores in certain locations of the powder bed. Hence, a higher porosity is simulated, giving higher measured values than those corresponding to the straight line of the powder in question.

From the expanded equation (11), we derive (12):

$$S_v = \frac{C}{\rho}\left[\frac{h_0}{h}(t - t_0)\cdot e^{a'(E_0 - E)}\right]^{\frac{1}{4}}$$

where the quantity C cannot be determined by experiment due to the fact that the effective surface area of the cement particle is not known. In order to determine C, two possibilities were investigated:

1. Calibration with Empa-Standard cement. According to the relation (10) in an S_v - t_{∞} diagram, C is equal to the slope of a straight line passing through the origin. Hence, it is merely necessary to fix a single point on this straight line for determining C.

The Empa-Standard cement has a Blaine value of 3,140 cm.²/g. As ρ = 3.16 g./cm.³, the specific surface per unit volume is equal to: S_v = 9,922 cm.²/cm.³.

Furthermore, for e = .6: $(t_{\infty})^{\frac{1}{4}}$ = 5.13 sec. $^{\frac{1}{4}}$, and it follows that:

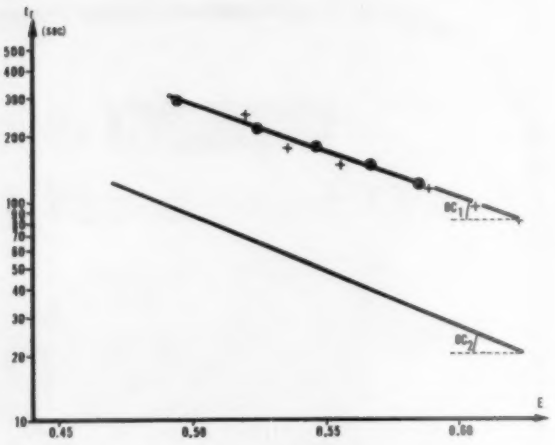


Figure 4. Time of flow in function of porosity.
Bovist spores: $a_1 = tg\alpha_1 = -4.418$
Cement, clinker: $a_2 = tg\alpha_2 = -5.102$

$$C_{Empa} = \frac{S_v}{(t_{\infty})^{\frac{1}{4}}} = 1{,}934.19 \text{ sec.}^{-\frac{1}{4}} \text{ cm.}^{-3}.$$

2. Calibration with Bovist-spores (Lycoperdon piriforme). When perfectly ripe, Bovist-spores exhibit a globular shape and a diameter of 4μ. In the same manner as for clinker samples, the relation between the time of flow and the porosity was examined for Bovist samples. As it can be seen in Fig. 4, the straight line in the log t_r -e diagram determined for the spores is not parallel to the straight lines for clinkers.

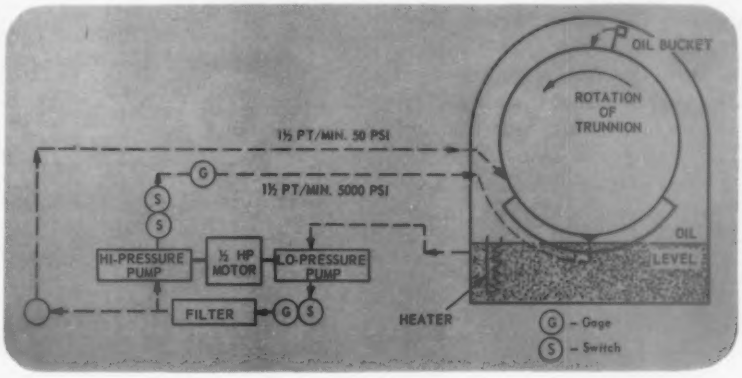
'a' for clinker and cement = -5.102; 'a' for Bovist spores = -4.418; furthermore for spores: S_v = 15,000 cm.²/cm.³; for e = .6, $(t_{\infty})^{\frac{1}{4}}$ = 10.12 sec.$^{\frac{1}{4}}$; hence, C spores = 1,482.21 sec.$^{-\frac{1}{4}}$ cm.$^{-3}$.

In comparing both calibrations, the factor C using Empa-Standard cement offers the advantage that the data prescribed in the standards for the commercial product are not subjected to any changes. At the same time, the application of a cement as a calibrating substance is disadvantageous due to aging effects which have an influence on the material properties. Moreover, the production of a new standard cement having the

Please turn to page 138

Table 2—Specific surface according to R. L. Blaine in cm.²/g. for three degrees of fineness

No. 1				No. 2			No. 3			
.5485	.5317	.5150	.4983	.5485	.5317	.5150	.5652	.5485	.5317	.5150
2,440	2,420	2,505	2,445	3,460	3,520	3,650	4,850	4,980	5,000	5,060
2,440	2,420	2,470	2,485	3,460	3,580	3,590	4,780	4,990	5,000	5,080
2,420	2,480	2,475	2,470	3,530	3,530	3,630	4,790	4,950	4,970	5,090
2,450	2,530	2,465	2,450	3,485	3,580	3,590	4,790	4,870	4,970	5,070
2,490	2,480	2,510	2,490	3,465	3,500	3,620	4,780	4,940	5,010	5,050
2,448	2,466	2,485	2,468	3,480	3,542	3,616	4,798	4,946	4,990	5,070



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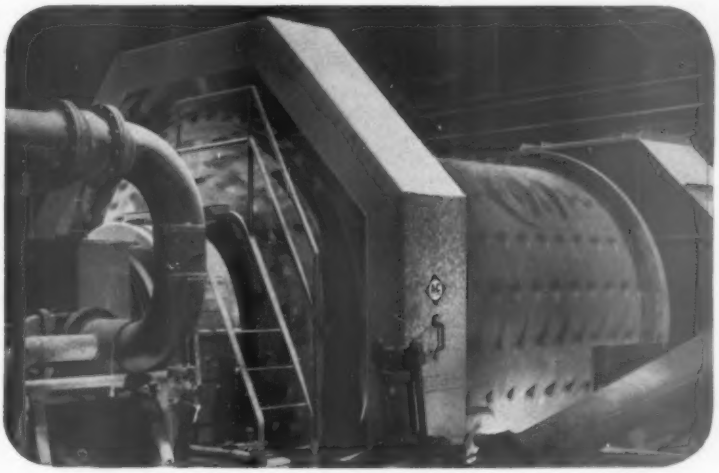

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Measure powders cont'd. from page 136

same specific surface and the same particle distribution might be rather difficult.

It can be expected that the Bovist spores will keep on growing for years without showing a change in shape or size. On this account, a long-time storage is not necessary. It also seems to serve the purpose to refer the specific surface to a sphere instead of to particles having a rather undefined shape. Corresponding to the ratio of the calibrating factors C_{Empa}/C_{spores}, the specific surfaces S_v calculated with Empa-Standard cement as a basis will be 1.304 times greater than for spore calibration.

Table 1 shows the comparison of both values for the surface areas for separated fractions beside the specific surface of corresponding globules computed for each particle size interval.

A comparison of the specific surfaces of the separated fractions determined for globules shows a relatively good accordance with the values obtained by using the factor C_{spores}, whereas the computed surface area for C_{Empa} is almost twice the magnitude compared with the surface of a sphere. For irregularly shaped bodies, the specific surface must always be greater than that of a sphere or a cube. It should, however, be borne in mind that most clinker particles do not differ to a great extent from the spherical or cubical shape. Hence, these considerations are also in favor of the spore calibration method.

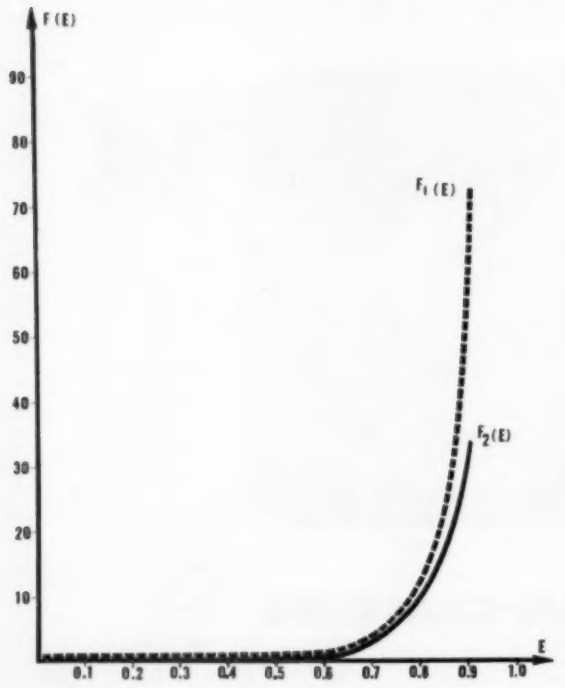


Figure 5. Difference between F_1 (E) and F_2 (E) for E = .6
———— $F_1(E) = E^3/(1-E)^3$; ———— $F_2(E) = e^{a'(E_0 - E)}$

Comparing equation (11) with the Blaine formula and the semi-empirical equation of J. Kozeny, P. C. Carman and R. L. Blaine (6):

$$S_v = \left[\frac{A}{5L\eta} + \frac{\Delta p}{Q} \cdot \frac{E^3}{(1-E)^2}\right]^{1/2}$$

with the perfectly empirical equation (12):

$$S_v = C\left[\frac{h_o}{h}(t - t_o) \cdot E^{a'(E_o - E)}\right]^{1/2}$$

In spite of the discrepancies discussed, the Blaine formula has been approved in numerous cases. It seems, therefore, that for some existing range of particle sizes this formula covers a wide adaptability. As it has already been stated for fine cements, the semi-empirical equation cannot satisfy since it disregards molecular flow. It still remains to prove the application of this equation to coarser powders.

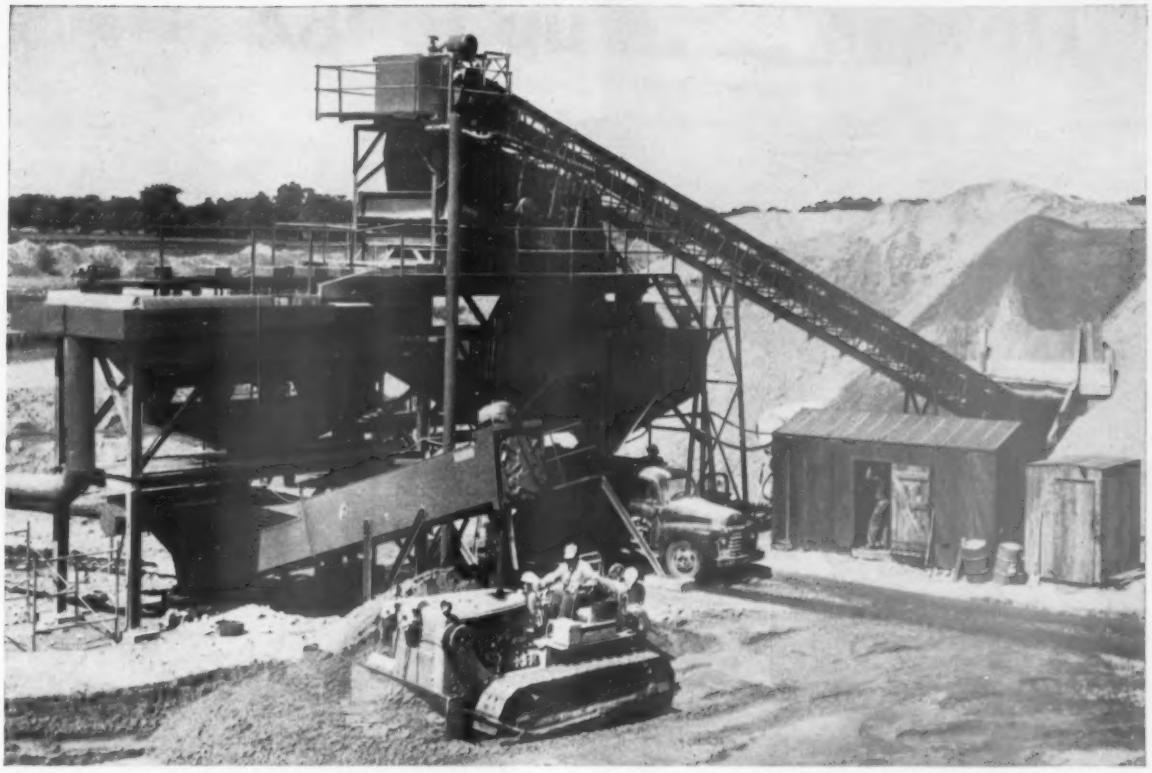
Substituting in equation (6) Q = v/t, where v = Quantity of air flowing during the time t, and keeping the characteristics of the apparatus, as well as Δp and v constant, we obtain the equation (13)

$$S_v = C'\left[t \cdot \frac{E^3}{(1-E)^2}\right]^{1/2}$$

The equations (13) and (11) differ from each other on the one side by the constants C′ and C, and on the other side by the factors $E^3/(1-E)^2$ and $e^{a'(E_o - E)}$. By a more suitable calibration of C, it can always be accomplished to make C′ = C. Fig. 5 represents these two functions $F_1(E)$ and $F_2(E)$. These curves have a great resemblance to each other, especially in the range E = O to E = .5. The difference between $F_1(E)$ and $F_2(E)$ attains the extreme value for the limiting value E = 1; as $F_1(E) \to \infty$, $E \to 1$; $F_2(E) \to 109.85$, when $E_o = .6$ and $E_1 \to 1$.

By desisting from the relation C′ = C, E_o can be chosen arbitrarily. However, if E_o would even assume both limiting values 0 or 1, the function $F_2(E)$ would always tend to approach $E \to 1$, a finite value. For low porosities and provided C′ = C, the formula (13) gives almost the same results as formula (11). The deviations become greater for increasing porosities.

According to Fig. 5, the difference between $F_1(E)$ and $F_2(E)$ for porosities up to .5 is on the order of the errors of measurements. As shown in Fig. 3, a cement having a specific surface of 2,500 to 3,000 cm.²/g. Blaine can, at the most, be compressed to a porosity E = .5. Consequently, the Blaine formula should only be applied for specific surfaces up to 3,000 cm.²/g. END



NEW Pioneer *Hydro-Screen* Washing Plants are easily adapted to changing pit conditions and product requirements. Unitized to be transportable in sections

Now...What's *your* aggregates washing problem?

● Whatever your problem, you may very well find that PIONEER has already designed and field-tested *your* answer . . . in one of its brand new family of *Hydro-Screen* Washing Plants!

Planned for growth as your business increases, there are many models to meet many needs . . . yet each is easily evolved from a simple basic design.

For example, Model 506-WT (shown above) has a 5′ x 12′ vibrating *Hydro-Screen*, a 10′ x 20′ Water Scalping Tank and a 36″ x 25′ Single Screw Classifier. It has a rated capacity of from 160 to 240 tph. Similar models with smaller or larger components for lesser or greater capacity are also available.

To meet other needs, there are other models, some without a Scalping Tank, others including a Revolving Scrubber. And, to any of these models you can easily add a Buzzer Screen for producing a fifth product, or Stockpiling Conveyors to augment or replace the bins.

What's more, any of these components can be added to a basic plant as your need arises. Not even structural members are wasted.

Unique new heart of these remarkably adaptable, all-electric Plants is the PIONEER *Hydro-Screen*, which cascades material through high-pressure water sprays to wash it specification-clean.

In fact, the *Hydro-Screen* combination of 1) *spray bars on all 3 decks*, 2) the *step-deck* design of the second deck, and 3) the *circle throw* of the inclined vibrating screen is so effective that screening capacity is 2½ to 3½ times greater than of a dry screen.

For all the facts on PIONEER *Hydro-Screen* Washing Plants, see your nearest PIONEER Distributor

PIONEER 306-W Washing Plant is an efficient semi-portable Plant with built-in scrubber, revolving screens, and screw classifier, complete and ready to go. Later, if you wish, you can add crushers, stockpiling conveyors, and other screening and sizing units. Rated capacity is from 50 to 75 tons per hour.

PIONEER 405-W Washing Plant has giant capacity in dirty materials. Can produce up to 2 different sizes of sand, 5 sizes of stone simultaneously . . . at production rates up to 200 tph. Secret of high capacity is big revolving scrubber working with inclined 4′ x 20′ tandem vibrating screen.

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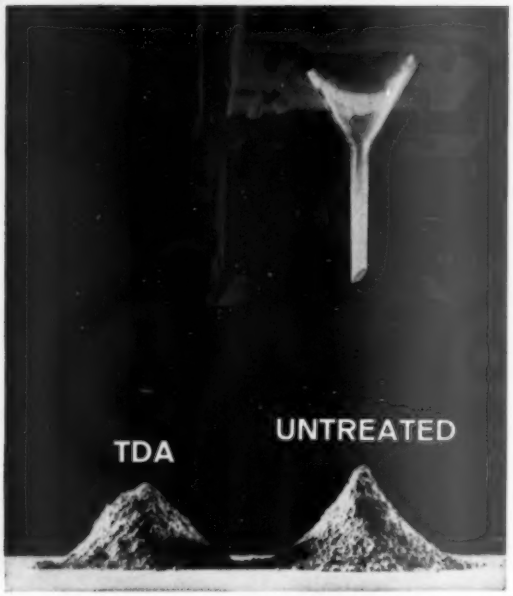

Laboratory test demonstrates dry-dispersion characteristics of TDA-treated cement. Here, cement samples poured from mechanically-vibrated funnels under closely controlled laboratory conditions are graded by their resulting slope, or "angle of repose." The lower slope of TDA-treated cement signifies greater dispersion, lower resistance to flow.

Two able-bodied men should be able to unload a hopper-car of cement in an hour or two. But if the load has become compacted or pack-set en route, the same job may take two days . . . 32 man hours, at $3 per hour!

There's a practical way to beat the problem. The answer is Dewey and Almy's TDA, a cement dispersant which makes cement flow easily and smoothly. In fact, tests show that TDA cement is 6 times easier to start flowing than untreated cement.

TDA is also a *grinding aid* which can increase mill output 10-50%, depending on conditions. When you consider this combination of benefits, doesn't it make sense to evaluate the use of TDA in *your* cement?

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☐ Please make arrangements for your engineer to assist in a full-scale test grind at our plant.

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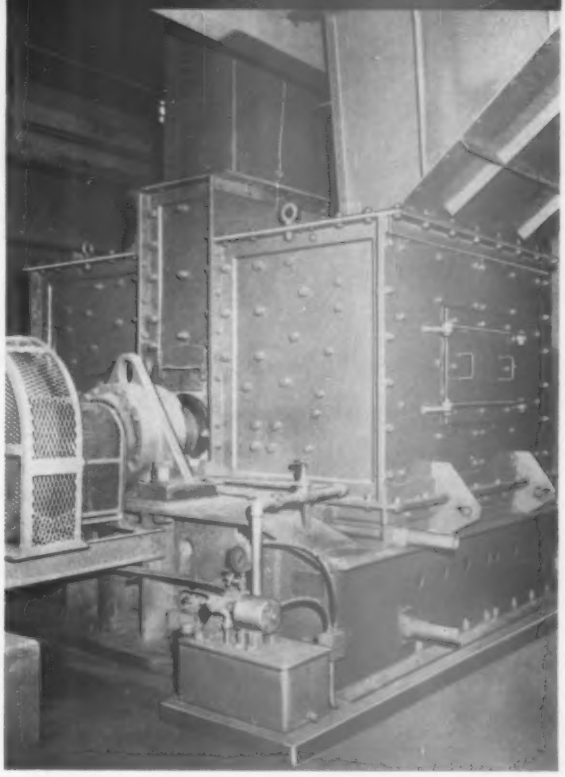
Rocky's Notes *continued from page 18*

—or gypsum—is a by-product of several industries, and various attempts have been made in this country, with very unsatisfactory results, to use it as a retarder in portland cement. The Japanese have made a study to learn why. They tested nine kinds of by-product gypsum, and came to the following conclusions:

"(1) The influence of gypsum produced in the manufacture of fluoric acid or titanic oxide on the qualities of cement did not differ from that of the natural gypsum. (2) Cement using gypsum produced in recovering sodium chloride from Glauber's salt and calcium chloride showed slight false setting and lower strength at later ages. (3) Cement using gypsum produced in phosphoric acid manufacture showed abnormally long setting time, lower strength at early ages and very slight false setting. (4) Gypsum produced in phosphoric acid manufacture contained phosphorus, fluorine and organic substance; parts of these impurities are occluded in the gypsum crystal. (5) Very small amounts of sugar or humic acid, sodium silicofluoride and phosphoric acid added together result in much longer setting time than when any of these impurities are added separately. (6) The cause of the abnormal retarding effect of gypsum produced in phosphoric acid manufacture appears to be the presence of the impurities mentioned, which exist in and around the gypsum crystal. (7) To improve or obviate such effect, it is necessary to decompose and stabilize the impurities occluded in the gypsum crystal, since it is impossible to remove these impurities by washing only."

Effect of Temperature: Every ready-mixed concrete manufacturer is well aware of the effects of temperatures of cement, water, sand and aggregate on the characteristics of his concrete. A Japanese researcher gives this explanation: (1) It was recognized that setting is slightly accelerated by raising the temperature of cement when the temperature of the water remains constant. However, when the cement temperature remains constant and the water temperature is raised, there appears no change in the setting time. (2) False setting appears only when the temperature of both cement and water is especially high. (3) The linear shrinkage of neat cement paste in its early stage is not affected by cement temperature between 20 and 70 deg. C. (4) Flow value of mortar decreases by raising the temperature of cement, water and sand. (5) By raising the temperatures of water, cement and sand, the compressive strengths after 3 days is increased while the 28-day strengths are decreased. *Please turn to page 142*

Another size reduction problem solved by Hammermills, Inc.



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Reduces 6" to 8" Limestone to ½" and under at 400 T.P.H.

Limestone in one installation contains 15 to 16% silica. This Bulldog Reversible Impactor, used as a secondary crusher, operates in a closed circuit with a power consumption of 600 h.p.

Throughout the industry, Bulldog Reversible Impactors are playing leading roles in lowering crushing costs, insuring lower ball mill costs and increasing ball mill capacity.

Hammermills, Inc. can help you lower costs and increase your capacity. For the name of the Hammermills representative in New York, Chicago, St. Louis, Toledo, Dallas, Denver, Los Angeles and Melbourne, Florida, simply write.

Manufacturers of Hammermills for Primary and Secondary Crushing • Impactors • Jaw Crushers • Roll Crushers • Cone Crushers • Wobbler Feeders • Apron Feeders

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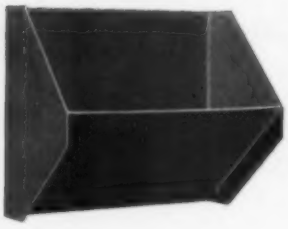

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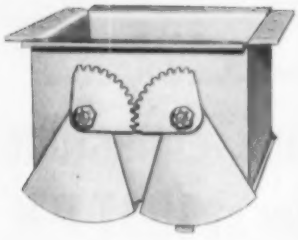

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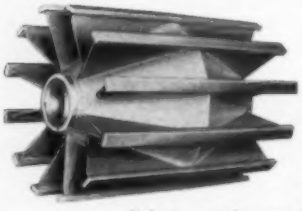

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Rocky's Notes

continued from page 141

Another research on the effect of initial curing temperature and admixtures on cement and concrete characteristics drew these conclusions: (1) The strength of mortars cured at 50 deg. C. initially or mixed with accelerators was greater at early ages, but the development of strength was smaller in comparison with mortars cured at 5 deg. C. initially or mixed with retarders. (2) For each cement mixture, a certain relation exists between the compressive strength of mortars and the specific gravity or porosity of the cement pastes, regardless of the initial curing temperature and the kinds of admixtures. Therefore, the compressive strength of mortars can be presumed from the specific gravity or the porosity of the cement pastes within a mean error of 30 kg./cm^2. (3) Based upon the ratio of specific surface area to the combined water of the cement paste, it was observed that the initial grain size of the hydrated products of cement cured at 5 deg. C. initially or mixed with retarders was larger than that of the hydrated products of cement cured at 50 deg. C., initially or mixed with accelerators. (4) Hydrated cement showing smaller initial strength by retardation had greater porosity and larger grain size initially, and so it can be concluded that the progress of hydration of the cement is easier, and greater strength develops at later ages than in the case of hydrated cement showing larger initial strength by acceleration of the hydration.

Please turn to page 145

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Lima 1250 3½-yd. Shovel nears end of million-and-a-quarter-yd. excavating job on highway reconstruction project near Knapp, Wis.

"LIMA 1250 moves half million yards of rock—at 270-300 yards hourly!"

says Lawrence Gerke, Wisconsin contractor

The job was tough, the schedule tight. "In only 2 miles," says contractor Lawrence Gerke, of Merrill, Wis., "we had to excavate a million and a quarter yd. . . . almost half of it rock!"

High performance, low maintenance

The project involved reconstruction on U. S. Interstate 94 near Knapp, Wis. Gerke needed a high performance machine with low maintenance requirements. He says, ". . . After considerable analysis of equipment, we purchased a Lima Type 1250 for rock excavating. In many cases no blasting was done. Yet, working in this material, the Lima constantly averaged 270 to 300 yd. per hour. When shovel work was completed, the 1250 was easily converted in the field to a dragline."

The crawler-mounted Type 1250 has turned in outstanding performances everywhere as a 3½-yd. shovel, 85-ton crane, and variable dragline.

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Main operating and auxiliary functions are air-controlled for smooth, precision performance at full capacity operation. Choice of diesel engine or electric motor with torque converter.

Other features and available equipment include: Independent propel, extra-high-speed hoist attachment, third drum, power reversing hoist drum, two types of rigid and folding gantries. The 1250 can be knocked down to units of less than 60,000 lb. for haulage.

Whatever your job, there's a Lima type and size exactly right—½ to 6-cu. yd. shovels, cranes to 110 tons, draglines variable. Learn now why so many contractors agree with Lawrence Gerke when he says, "We are completely satisfied with the operation of our Lima." See your nearby Lima distributor or write to us.

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Rocky's Notes *continued from page 142*

Portland Blast-Furnace Slag Cements: In addition to the data quoted in our April "Notes," are the following, in a paper from the Public Works Research Institute, Ministry of Construction: (1) Properties of cement are altered by fineness, slag content and grinding method. As a rule, strength at early ages is similar to the strength of normal portland cement and is not much affected by slag content. (2) Heat of hydration of portland slag cement containing up to 50 percent slag is similar to that of moderate-heat portland cement, and above 60 percent slag similar to that of low-heat portland cement. (3) Portland slag cements containing up to 50 percent slag behave similarly to normal portland cement and moderate-heat portland cement in setting time and mortar strength when placed at low temperature. (4) Autoclave expansion tests of portland-slag cements give considerably better results than those of portland cement. (5) Several types of portland-slag cements may be produced by selecting the manufacturing conditions.

In another paper, the author, from Osaka City University, found that with granulated slag from a particular steel plant, when substituted for 10 to 80 percent of the cement, better results were obtained in both strength and permeability tests than with straight portland cement, especially when the substitution of slag was 30 to 50 percent. In all the work quoted, it would appear that the proportions are by weight.

Fly Ash: In addition to developing much new information on portland-cement-slag mixtures, the Japanese have also done much work with fly ash. However, they don't just use as much or as little as they can. They go about it as scientifically as apparent in all their investigations. The authors (cement company researchers) state: In case fly ash is used in general structural concrete mix, where fly ash is substituted for unit weight of cement, the compressive strength decreased at early ages. In order to prevent this decrease, it is necessary to add more fly ash to that already substituted for the cement.

The authors further observed that when concrete contained a constant ratio of cement to fly ash, it holds to the water-cement ratio theory. With increase in the amount of fly ash used, the unit water content and gravel-sand ratio were observed to decrease or increase linearly. On the basis of this observation they propose a method of designing concrete mixtures containing fly ash which will give the same strength as that given by ordinary concrete at 7 and 28 days. In order to obtain workability it is required to select suit-

Please turn to page 147

STARSTEEL
HEAVY DUTY SPACE SCREENS

Tough, rugged STARSTEEL Screens give up to double the service life of ordinary replacements—save up to half your screen costs!

Specially alloyed STARSTEEL high-carbon wire shows amazing resistance to abrasion and fatigue—rigid, accurate weaving prevents buckling and distortion—absolutely square precision-applied hook strips make installation easier, insure tighter, uniform surface tension that means longer wear under the most punishing operating conditions.

Take ALL the guesswork out of screen buying—*order STARSTEEL.* Prices are sharply competitive.

Fast Shipment from stock on most weaves and sizes.

Star will produce screens or cloth from stainless or other steel alloys, Monel, brass, bronze, copper, aluminum or any metal that can be drawn into wire. Inquiries invited.

STAR
WIRE SCREEN & IRON WORKS, INC.
2515 San Fernando Road • Los Angeles 65, Calif.
Subsidiary of Ludlow-Saylor Wire Cloth Company, St. Louis, Mo.

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PICKLED in a 4% brine solution!

CHOKED
in a tornado of abrasive dust!

FROZEN
for weeks at 75° C below zero!

BURIED ALIVE
in thick, sluggish mud!

nothing . . . but nothing stops Super-Seal open-type motors

Thanks to exclusive Poxeal and Silco-Flex insulations, Super-Seal motors have shown endurances that even enclosed motors couldn't match. Results and reasons available from your A-C representative or distributor. Or write General Products Division, Milwaukee 1, Wisconsin

Poxeal, Silco-Flex and Super-Seal are Allis-Chalmers trademarks.

ALLIS-CHALMERS A-C A-1151

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Rocky's Notes *continued from page 145*

able values of W/C+F and F/C+F, where W=water, C=cement, F=fly ash. From that point on they develop their proportions by formula and charts.

Another paper on cement-fly ash mixtures draws these conclusions: (1) Where the slump is the same, concrete containing fly ash needs less water than plain concrete, and the need for water is remarkably less as the fly-ash replacements are increased, though the proportions may be richer or poorer. (2) When concrete in which cement is replaced 10 to 20 percent (in weight) by fly ash is cured in water at 20 deg. C., its compressive strength at early ages falls below that of plain concrete in accordance with replacement increases, but at later ages its strength rises above that of plain concrete. (3) The drying shrinkage of rich-proportioned concrete becomes smaller when admixed with fly ash.

Another study found that there is no great difference in durability between fly-ash concrete and plain concrete.

There are many other interesting studies for which we have no space here. In this review we have omitted the authors' names and their connections, for which we apologize. It was done only to save space for as complete a picture as possible. We trust the individual authors will derive satisfaction from this publicity devoted to their national rather than their individual work. **END**

"JUST LOOK AT THAT 1½ YARD SHOVEL! WISH WE HAD SOMETHING LIKE THAT ON MARS!"

Winslow TRUCK SCALES

PIT AND PITLESS TYPES

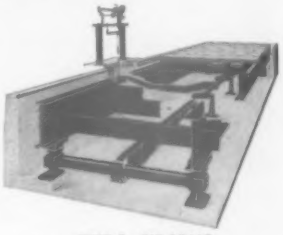
CABINET DIAL

Weight indication available includes ball bearing poise weigh-beams, direct reading and weight imprinting types, and dial equipment with or without weight printer.

Write or phone for more information
PHONE NORTH 1231

TYPE CS—PORTABLE—PITLESS

Type CS scales, pitless installation, roller bearings, heavy duty, low maintenance. Capacities 15 tons thru 50 tons. Platform sizes 18' x 9' thru 40' x 10', wood or steel deck.



TYPE S—PIT SCALE

Type S scales, pit installation, roller bearings, heavy duty, low maintenance. Capacities 15 tons thru 60 tons. Platform Sizes 22' x 9' thru 60' x 10' for wood or concrete decks.

WINSLOW GOVERNMENT STANDARD SCALE WORKS, INC.

4810 NORTH 25TH ST. TERRE HAUTE, IND.

SCALE MANUFACTURERS FOR OVER A HALF-CENTURY

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LOW COST POWER

For Fast "Secondary Breakage"

FREDERICK

CAST SEMI-STEEL

DROP BALLS

Tough, rugged Frederick Drop Balls give you crushing power where you want it, when you want it . . . cut down expensive drilling or blasting . . . give long, economical service with little or no maintenance. Exclusive "Pear shaped" design withstands greater impact—drops straighter. "E-Z Swing" recessed steel eye gives cable protection plus free swinging action. Use Frederick Cable Weights (135 & 250 lbs.) and Frederick Swivels on all size balls for true, safe cable performance. Nickel alloy standard on all 4000 lbs. or over—or special alloys furnished on request. Balls can be furnished with replaceable pins. Special release hooks for free dropping also available.

Write us today for prices and illustrated literature. Order Balls direct or see your nearest Equipment Dealer.

	Wide Range of Sizes and Weights:							
Pear shape (lbs.).....	1500	2000	3300	4000	5200	6500	8000	10,000
Ball shape (lbs.).....	500	1000	2000	5200				
Spherical shape (lbs.) .. (for magnet use)	470	950	1650	2400	3000	3700	5400	6900

FREDERICK IRON & STEEL, INC.

FREDERICK *Established 1890* MARYLAND

Phone: MOnument 3-5111

CENTRIFUGAL PUMPS • MUNICIPAL AND GRAY IRON CASTINGS

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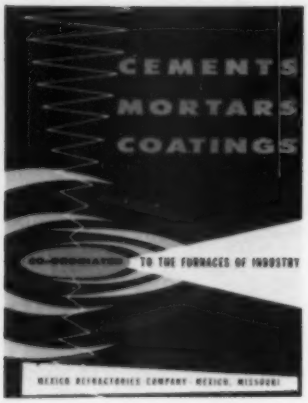
NEW

LITERATURE



Refractory cements

MEXICO REFRACTORIES CO. Div. of Kaiser Aluminum & Chemical Corp. has just released a 16-page booklet, "Cements, Mortars, Coating—Coordinated to the Furnaces of Industry." Since high maintenance costs in industrial furnaces continue to result from improperly matched mortars and brick, the company has completed another extensive revision in its program of refractory cement specialization. Description and data on the expanded line of products for furnace savings appear in the booklet.

Enter 500 on Reader Card

All-motor and integral motoreducers

THE FALK CORP. has released a revised Booklet 3100 on their motoreducers. Revision was required to incorporate rerated NEMA standard motors through 75 hp., and to incorporate increased overhung load and thrust capacities for the first three unit sizes. ***Enter 501 on Reader Card***

Equipment cost book

CATERPILLAR TRACTOR CO. has issued two Time and Cost Record Books designed to help the equipment owner keep accurate records of all equipment costs. Daily Time and Cost Record Booklet, Form 32818-G, is pocket-sized and is designed to be used in the field to record costs. Monthly Time and Record Cost Book, Form 33215, has a line for each day and space for all 12 months. All costs, including fuel, lubricants, repair parts and labor, and operator's time have spaces allotted. Monthly and yearly totals can be made to get a close check on actual costs. ***Enter 502 on Reader Card***

Setting of cement

THE RESEARCH AND DEVELOPMENT LABORATORIES of the Portland Cement Association have released research department Bulletin 98, "The Setting of Portland Cement, A Review of Theory, Performance and Control." A new and original report of the association, the 124-page book is called the most up-to-date and thorough review available.

Enter 503 on Reader Card

Plate magnets

STEARNS MAGNETIC PRODUCTS has issued a bulletin describing their new Indox V Plate Magnet models. This bulletin gives detailed selection data through which a plant engineer or production man can select his own magnet for existing chutes, ducts, conveyors or other material handling equipment. Tables in the bulletin show recommended magnet size according to conveyor size, speed of material flow, size or mesh.

Enter 504 on Reader Card

Industrial engines

DETROIT DIESEL ENGINE DIVISION, General Motors Corp., has made available a booklet describing its wide line of industrial engines. Top feature of the line is interchangeability of parts, achieved by using only three cylinder sizes in engines ranging in power from 20 to 1,650 hp. Up to 70 percent of all moving parts can be interchanged. Two-cycle design, compactness and light weight are other advantages.

Enter 505 on Reader Card

Vibrating feeders

THE JEFFREY MFG. CO. has released Catalog 930, a 96-page book on its line of electric vibrating feeders and conveyors. Controls, installation methods, principles of operation and individual unit specifications are included.

Enter 506 on Reader Card

Gear and fluid drives

LINK-BELT CO. has released a 48-page book that gives information on the company's gearmotor and fluid drives. The book describes the functions of these various types of drives and provides detailed selection data, dimensions, overhung load ratings and mountings. It also lists such accessories as couplings, backstops and slide rails. Capacities of the 45 new units range up to 100 hp. with output speeds from 280 down to 1.8 rpm.

Enter 507 on Reader Card

Mining equipment catalog

INTERNATIONAL HARVESTER CO. has published a 16-page catalog entitled "International Production Equipment for Modern Mining." Thirty-five photographs, plus five sketches and complete information describe the company's equipment in action on jobs such as stripping, surface and underground mining, non-metallic mining, building haul roads and maintenance.

Enter 508 on Reader Card

(Continued on page 152)

Enter 1021 on Reader Card

Stabilized Base Mixer Produces

700 TONS PER HOUR

for Oklahoma Interstate Rt. 35

Want lowest cost per ton?

buy Cedarapids Built by IOWA

STABILIZING AGENT ATTACHMENTS MEET MIX SPECIFICATIONS

With this versatile unit, you can mix a controlled amount of water with the aggregate, or add calcium chloride, Portland Cement or emulsified asphalt, as specified. Cedarapids feeders provide precise metering of these materials into the mixer.

That's a production record for plant-mixed stabilization material in Oklahoma! Specifications called for a particularly high quality of mix, too. But Amis Construction Company's Cedarapids Twin-Shaft Stabilized Base Mixer blended three sizes of aggregate, mixed it thoroughly with a precisely controlled amount of water, and produced over 700 tons of stabilized aggregate base per hour! In other States, Cedarapids Stabilized Base Mixers are producing as high as 860 tph as a measured minimum!

Production like this is one of the many Cedarapids benefits that assure lowest cost per ton. In the Stabilized Base Mixer, and *every* plant or component in the complete Cedarapids Line, engineering emphasis is placed on high production, the ability to meet strict specifications, and low-cost operation. It adds up to more profit on each ton you produce!

Bulletin SBM-1 gives complete engineering details of the two sizes of Cedarapids Stabilized Base Mixers. Send for your copy today.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U. S. A.

RAYMOND Whizzer SEPARATION

CONTROLS THE QUALITY OF YOUR PRODUCTS

RAYMOND
Double Whizzer
Mechanical
Air Separator

Built in ten sizes
up to 18' diameter

THE Raymond Mechanical Air Separator with its efficient Whizzer action offers special advantages in classifying powdered materials for the non-metallic industries. It has three general types of application covering a wide range of products.

(a) In closed circuit with a grinding unit for increasing fineness and mill capacity.

(b) In open circuit operation for removing a coarse fraction to deliver a uniformly fine product.

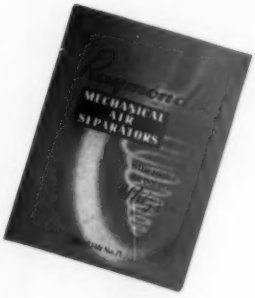
(c) In open circuit for dedusting operations to remove objectionable fines in making granular products.

The Whizzer principle gives sharper separation with a greater percentage of recovery of fines, and also provides a wide classification range up to 99.9% minus 400-mesh materials.

Raymond Separators may be provided with an internal air distribution system for handling special materials, which require some cooling or drying. For classifying abrasive materials, additional liners are furnished.

For improvement of your products, specify the Raymond Whizzer Separator for classifying lime, gypsum, cement, plaster products, chemicals, fillers and fertilizers.

Laboratory Separator
for classifying small
batches in test work



For further details,
write for Raymond
Separator Bulletin #76

COMBUSTION ENGINEERING, INC.

Raymond Division

1108 W. BLACKHAWK ST.
CHICAGO 22, ILLINOIS

Combustion Engineering-Superheater Ltd., Montreal, Canada

SALES OFFICES IN
PRINCIPAL CITIES

Enter 1090 on Reader Card

ONLY GARDNER-DENVER ROTARIES

Give you all these field-proved portable compressor advantages

Left to right, Models RP125, RP210, RP365, RP600, RP900.

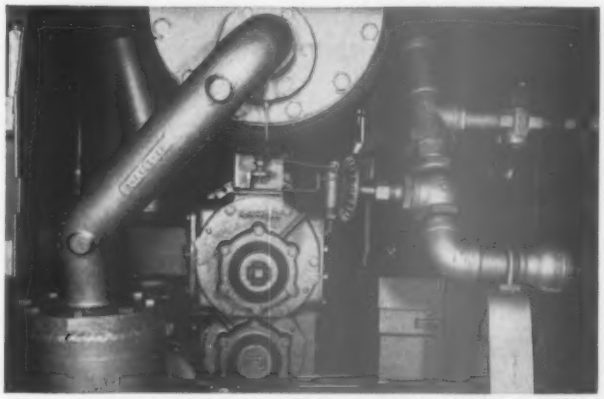
Safe, sure all-weather operation—water-oil cooling system keeps engine and compressor temperature constant.

Lubricated cold-weather starting—clutch allows compressor oil to be warmed before engaging compressor.

Positive flood lubrication—instantaneous oil flow not dependent on receiver pressure.

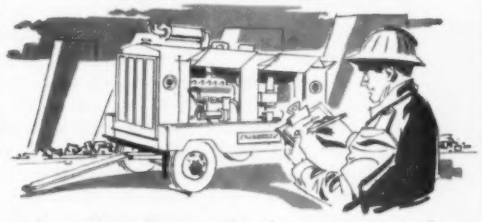
Fuel economy plus—exclusive Gardner-Denver "THRIFTMETER"® saves fuel, saves wear and tear on engine and compressor.

Simplified field maintenance—all compressor parts are easy to get to, making inspection and field maintenance faster and easier. See your Gardner-Denver distributor or write for bulletin.



The Gardner-Denver rotary requires no major dismantling job for inspection of working parts. Only a few minutes are required to remove the 12 cap screws to expose all the blades for routine inspection or replacement that assures trouble-free operation.

KEEPING TAB ON PROGRESS



At Gardner-Denver there's no substitute for men—our philosophy of growth for 100 years. Gardner-Denver engineers know your field from field experience . . . keep in constant touch with men and machinery . . . seek new ways of developing surer, safer, more productive equipment.

Gardner-Denver RP900's on Glen Canyon diversion tunnel job provide trouble-free air for all phases of this major project.

GARDNER-DENVER Since 1859 100 1959 YEARS

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ont.

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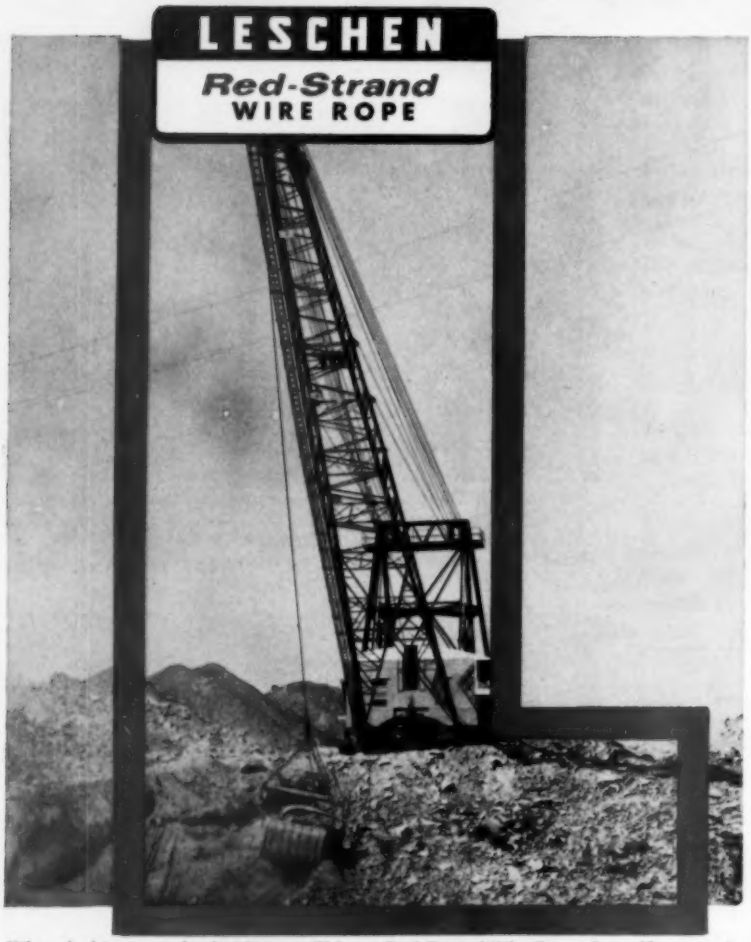
when the going gets rough-

give 'em "L"



When the bite is on the dragline you'll be glad you rigged with *Leschen*—the wire rope that's the same top quality in every foot of every reel. At Leschen there are new machines with exclusive new continuous-flow technique. Try Leschen Red-Strand Wire Rope. Its uniform quality makes your operation safer, your replacement time farther in the future.

Leschen Wire Rope Division,
H. K. Porter Company, Inc.,
St. Louis 12, Missouri.

LESCHEN WIRE PORTER ROPE DIVISION

H.K. PORTER COMPANY, INC.

PORTER SERVES INDUSTRY: with Rubber and Friction Products—THERMOID DIVISION; Electrical Equipment—DELTA-STAR ELECTRIC DIVISION, NATIONAL ELECTRIC DIVISION; Copper and Alloys—RIVERSIDE-ALLOY METAL DIVISION; Refractories—REFRACTORIES DIVISION; Electric Furnace Steel—CONNORS STEEL DIVISION, VULCAN-KIDD STEEL DIVISION; Fabricated Products—DISSTON DIVISION, FORGE AND FITTINGS DIVISION, LESCHEN WIRE ROPE DIVISION, MOULDINGS DIVISION, H. K. PORTER COMPANY de MEXICO, S. A.; and in Canada, Refractories, "Disston" Tools, "Federal" Wires and Cables, "Nepcoduct" Systems—H. K. PORTER COMPANY (CANADA) LTD.

Enter 1117 on Reader Card

NEW LITERATURE

(Continued from page 148)

Rotary compressor

INGERSOLL-RAND CO. has published a 4-page booklet about their 125 cfm. portable rotary compressor. This compressor has thermo-by-pass control of both compressor and engine cooling system which maintains proper operating temperatures. Oil drains automatically from cylinders when unit is shut down. With a speeder of 1,800 rpm., the compressor has full length tool boxes with storage capacity. The booklet illustrates the machine, detailing its weights and dimensions.

Enter 516 on Reader Card

Timing belt drive

ALLIS-CHALMERS MFG. CO. has published a bulletin describing their timing belt drive constructed with steel cords imbedded in neoprene fully molded with nylon base fabric. This "Time-Tex" belt drive is suitable for a wide range of load applications—from sub-fractional to 600 hp. with a torque load range from thousands of ft. lb. down to light loads.

Enter 517 on Reader Card

Elevator cable

THE COLORADO FUEL AND IRON CORP. has published a 4-page wire rope folder that describes the need for and uses of preformed elevator cable. It includes information on six strand and eight strand constructions and outlines their proper uses of various elevator applications. Typical reeving diagrams and wire rope recommendations are included.

Enter 518 on Reader Card

(Continued on page 154)

Beat tough "Specs" with the

MECKUM SAND & GRAVEL JIG

New Jersey Indiana Ohio New York Illinois

Minnesota

West Virginia

Scotland

Utah

England

Iowa

Pennsylvania

REMOVES
WOOD
LIGNITE
COAL
SOFT STONE
POROUS STONE
CHERT
OCHRE
SHALE
CLAY

from aggregates at the lowest initial and operating cost available.

The Meckum Jigs' high acceptability and performance is proven as the jigged aggregates meet increasingly rigid 'specs' with ease, enabling you to obtain new contracts and greater profits. With amazing simplicity and low cost of operation, Meckum Jigs produce premium quality concrete aggregates for only a few pennies per ton.

More Meckum Sand & Gravel Jigs have been installed, than any other method of removing deleterious materials from aggregate. Don't delay, be prepared. Find out how a Meckum Jig can benefit you.

m

ECKUM ENGINEERING, INC.

DAYTON ROAD OTTAWA ILLINOIS • 53 W. JACKSON BLVD., CHICAGO 4, ILLINOIS

Enter 1091 on Reader Card

NEW LITERATURE

(Continued from page 152)

Rotary drill unit

DAMCO Drilling Accessory & Manufacturing Co. Inc. has just published a 4-page booklet about their self-propelled rotary drill unit. Called the Blastholer, it can blast 20-ft. holes in 60 seconds, move the rig to the next hole and be ready for drilling in 30 seconds. According to the brochure, the Blastholer, in limestone quarries meeting highway specifications, can blast 20-ft. holes in 3 to 4 minutes. The booklet has two full-size illustrations, and details the drill unit's specifications.

Enter 509 on Reader Card

Crane carrier

SCHIELD BANTAM Co. has just released a 12-page book on its 11-ton carrier-mounted crane-excavator. The bulletin describes and illustrates the Model T-350, including the company line of crane carriers available for mounting and the company line of front-end attachments. Four complete pages are devoted to standard and optional features found on the T-350 upper unit. Included is the heavy-duty drum shaft and swing assembly, three types of boom hoists and a multiple speed transmission.

Enter 510 on Reader Card

Sheaves

ALLIS-CHALMERS MFG. Co. has just released a booklet on their "Adjustex" sheaves. Offered in all popular pitch diameter sizes and a new "C" section size, the 7.5/9.7, the sheaves are made in 2, 3 and 4 grooves for use with A, B or C section belts.

Enter 511 on Reader Card

Synchronous generators

ELECTRIC MACHINERY MFG. Co. has released Product Publication 2100-PRD-254 on its line of nonpackaged synchronous generators. Available in ratings of 187 kva. and larger, the high-speed generators have either single or three-phase ratings.

Enter 512 on Reader Card

Vibrating screen separator

DE LAVAL SEPARATOR Co. has published a 2-page bulletin describing their Syncro-Matic separator with controlled three-dimensional motion. The bulletin features pictures of the machine, specifications and blueprint diagrams. ***Enter 513 on Reader Card***

Engine reconditioning

CATERPILLAR TRACTOR Co. has issued booklet DE864, entitled "Money Saving Hints on Engine Reconditioning." The eight-page release answers such questions as: "What is the proper way of obtaining positive initial valve seating when reconditioning a diesel engine?" Another question answered is "What is the maximum diameter wear limit for a cylinder liner before it must be replaced?" ***Enter 514 on Reader Card***

Strain gage

THE RESEARCH AND DEVELOPMENT LABORATORIES of Portland Cement Association have issued research department Bulletin 96, "A Standardizing Strain Gage for Measurements Requiring Long-Time Stability." The gage is designed for materials like concrete, where long-time stability is important. Strains are found by measuring the electrical resistance of thin elastic wire. ***Enter 515 on Reader Card***

This high capacity Amplitrol "packaged" unit bolts directly to the hopper flange. Feeds to conveyors, crushers, screens, blenders, other process equipment.

"Feeder-Hopper Bottom Package" Reduces Design, Installation Costs!

For the first time a feeder is offered as part of a complete pre-engineered feeder-hopper bottom package. When you design with Carrier Amplitrol feeders, you merely design a hopper flange to bolt to the packaged unit. *This saves you both engineering design and installation costs!*

This preassembled packaged unit is built around the revolutionary new Amplitrol feeder — first mechanical vibrating feeder with variable, stepless control—and includes the hopper bottom, flanged hopper connection, skirt plates, regulating gate, isolation and suspension supports.

The feeder-hopper bottom unit is offered in two models—one for *high capacity* applications and one for *maximum control.*

Amplitrol's exclusive long-stroke drive handles higher capacities by automatically compensating for headload. This allows larger hopper openings, reduces bridging and hang-up. The simple, fast-responding pneumatic control system operates manually or in automatic response to any standard process instrumentation.

Send for new Bulletin No. 591 describing Amplitrol "package" in detail. Carrier Conveyor Corporation, 253-A North Jackson Street, Louisville, Kentucky.

CARRIER
-NATURAL-FREQUENCY-
VIBRATING EQUIPMENT
Engineering Specialists in Vibrating Equipment

CONVEY ● FEED
DEWATER ● SCREEN
COOL ● AGGLOMERATE
DRY ● SCALP ● COAT
DISTRIBUTE ● ELEVATE
● FLATTEN BAGS

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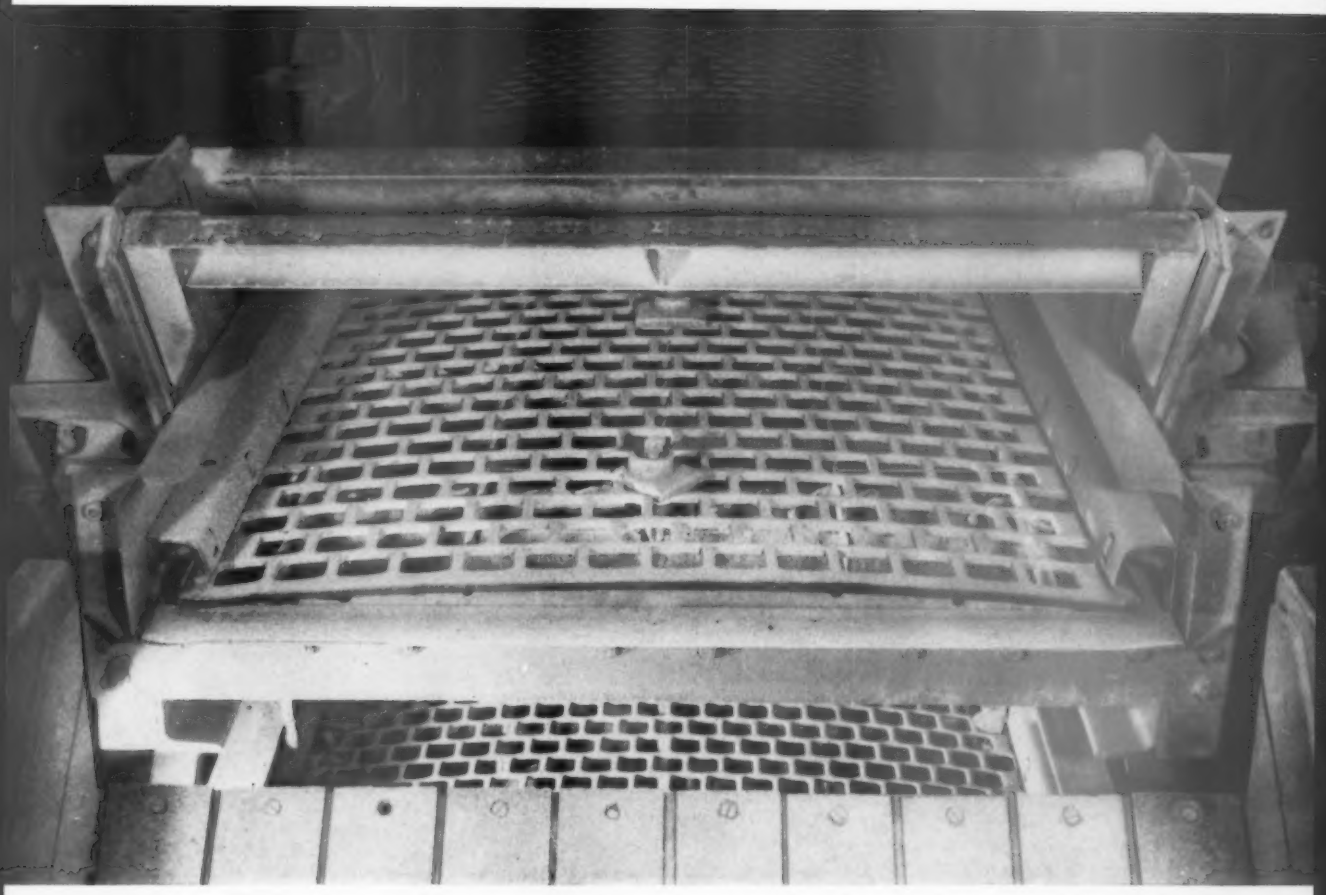
Enter 1020 on Reader Card



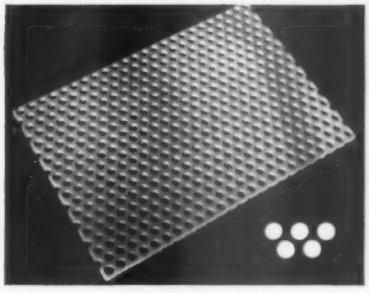
with **CROSS** perforated steel screens . . .

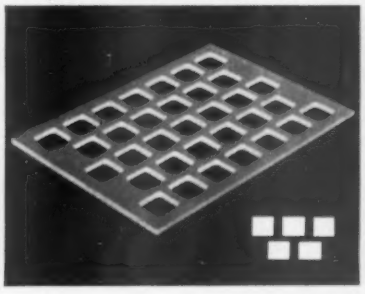
You can save up to 20% on replacement

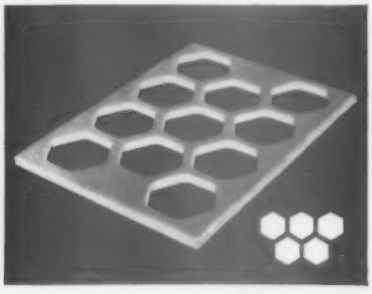
For many rock products applications, CROSS Perforated Screens made from high-quality steel can save you as much as 20% on replacement costs. Tests prove that CROSS Perforated Screens have a service life nearly double that of other types of screens. And, because CROSS screen plates are manufactured as rigid, one-piece units, there is no problem of stretching or loss of screen tension. You save on down-time costs, too, because screen adjustments and reshaping are eliminated.

CROSS PERFORATED steel screens are available in a wide range of sizes with uniformly spaced square, hexagon or round perforations, staggered for increased capacity and efficiency. For additional information on CROSS Perforated Screens for sand, gravel and rock products applications, write CROSS PERFORATED METALS, National-Standard Company, Carbondale, Pa.

CROSS makes a complete line of perforated screens to fit every need







CROSS Perforated Metals

Carbondale, Pa.

NATIONAL STANDARD

NEW U.S. PATENTS

OLIVER S. NORTH

Recently issued patents on nonmetallic minerals*

Kyanite

2,865,772—Method of making a lightweight insulating refractory brick consisting of 16-20 percent expanded **perlite,** 35-67½ percent calcined bauxite or other clay material, 5-15 percent raw **kyanite** and 2½-5 percent of a water-soluble aluminum phosphate binder. The binder and perlite are mixed first, and then the kyanite and clay added. Bricks are formed and fired to 2,300-2,550 deg. F. (to A. R. Lesar and G. W. Charles. Assigned to A. P. Green Fire Brick Co.).

2,866,714 — Process for making from **kyanite** concentrates a dense, volume-stable mullite-type refractory aggregate. Kyanite concentrates are mixed with phosphoric acid, phosphorus pentoxide, or the like, and the mixture tempered with water and briquetted. The briquettes are fired to convert the kyanite into an improved mullite product. (to V. D. Svikis. Assigned to Canadian Minister of Mines and Technical Surveys).

Asbestos

2,870,036—Use of **asbestos** fiber as a reinforcing filler in an asphalt mastic composition used for sealing joints between glass or enamel-coated pieces (to J. W. Stewart. Assigned to A. O. Smith Corp.).

2,883,354—Use of short **asbestos** fiber in a coal-tar-base joint-sealing compound for use on jet airport runways and the like. (to R. Sperling; Assigned to The Ruberoid Co.)

2,885,296—A material for stopping leaks in engine blocks, radiators, conduits, etc., comprises powdered **asbestos,** charred bonemeal, water glass and sal ammoniac. (to A. L. Welden; one-fourth each assigned to Clause A. Taylor, Ivor C. Neiland and Ben Cropper)

Sylvinite

British 807,715—Process for the concentration of KCl from **sylvinite** ore. Ground ore is washed with a non-aqueous, volatile medium such as trichlorethylene, given an electrical charge and electrostatically separated; (assigned to International Minerals & Chemical Corp.)

2,878,926—To clean a conveyor belt used to transport **sylvinite** ore, the belt is subjected to the scraping action of a tight coil spring. (to H. A. Harty, J. N. Dallman and V. G. Brunton; assigned to United States Borax & Chemical Corp.)

Phosphate rock

2,886,426—In the continuous manufacture of superphosphate from **phosphate rock,** the rock-acid mixture is subjected to a slow pressing and masticating action while vapors are simultaneously removed, and the solid reaction product is stored at 40-45°C. for several weeks. (to D. V. Gera; assigned to Montecatini-Societa Generale per l'Industria Mineraria e Chimica)

2,887,362—Wet process for manufacturing H_3PO_4 from **phosphate rock.** The $CaSO_4$ fines are removed prior to concentration of the H_3PO_4. (to R. Lee, Jr.; assigned to Phillips Petroleum Co.)

2,888,321—Process for making alkali metal polyphosphates from aqueous H_3PO_4 obtained by H_2SO_4 digestion of **phosphate rock.** (to A. N. Baumann; assigned to International Minerals & Chemical Corp.)

2,889,200—Process for defluorinating products derived from **phosphate rock** by acid digestion. Limestone is used instead of the more expensive lime. (to I. M. Le Baron; assigned to International Minerals & Chemical Corp.)

2,889,217—In treating high-fluorine, high-lime solutions obtained by acid digestion of **phosphate rock,** the material is treated with steam to volatilize the fluorine at low temperature by drying and calcining. (to I. M. Le Baron; assigned to International Minerals & Chemical Corp.)

2,887,428—A felted vibration damping sheet for use in autos and the like comprises **asbestos** fiber, fibrous **talc,** rag furnish, and an asphalt-synthetic rubber saturant. (to J. W. Baymiller and P. E. Merrifield; assigned to Armstrong Cork Co.)

Borax

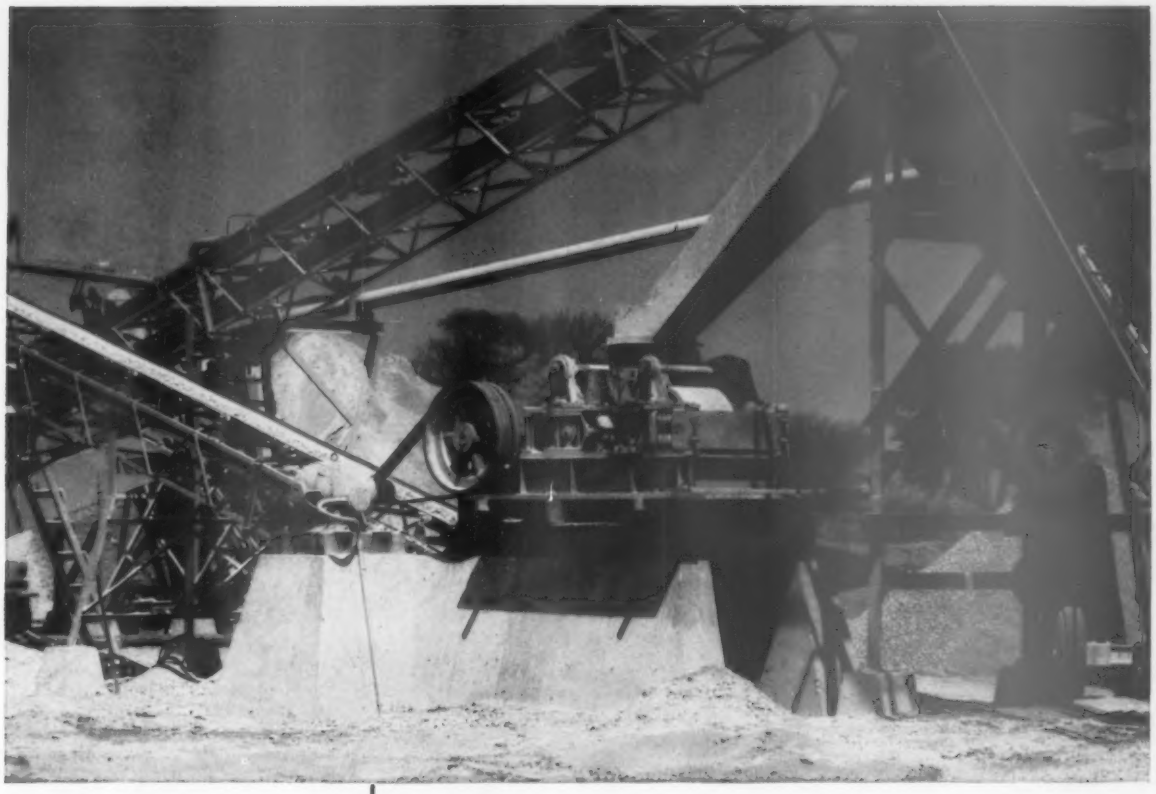
2,884,440—Process for reacting carbon dioxide, a borate salt containing water of hydration and an aliphatic alcohol to form a borate ester. Suitable borate salts include the ores **borax, colemanite, ulexite, kernite** and **Gerstley borate,** and solids derived from Searles Lake or other **natural boron brines.** (to G. N. Tyson, Jr.; assigned to Olin Mathieson Chemical Corporation)

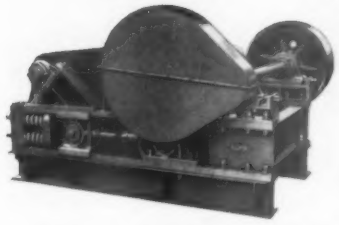
2,867,502—Method of obtaining a high yield of useful boron-containing compounds, such as ammonium pentaborate and boric oxide, from **borax** ore. (to H. Stange and S. L. Clarke. Assigned to Olin Mathieson Chemical Corporation).

Kaolin

British 810,487—In the manufacture of an improved ceramic-grade **kaolin,** purified crude kaolin is classified into plus and minus 2-micron fractions, and the finer fraction calcined and then reblended with the coarse material. (to S. C. Lyons; Mar. 18, 1959) *(Continued on page 161)*

*Copies of United States patents are available at a cost of 25 cents each from The Commissioner of Patents, Washington 25, D.C. For convenience, coupons, each good for one copy of any patent, may be purchased from that official at the rate of $5.00 per 20-coupon pad or $25.00 per 100-coupon pad.





Diamond Roll Crushers are available in roller bearing design, star gear or chain drive, and plain bearing design, chain driven.

Roll Sizes

16x16	30x18	36x22
24x16	30x20	40x22

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All Diamond units have two rolls . . . one is fixed, the other floats. To allow a slight cushion effect, and eliminate wear and tear due to shock, heavy tension springs hold the floating roll and permit quick opening in the event of overloading or in case tramp iron or other foreign materials enter between the rolls. This protects shells and other parts against damage.

Accessible mechanism and ease of adjusting the opening between the roll shells allow the size of the product to be changed at will.

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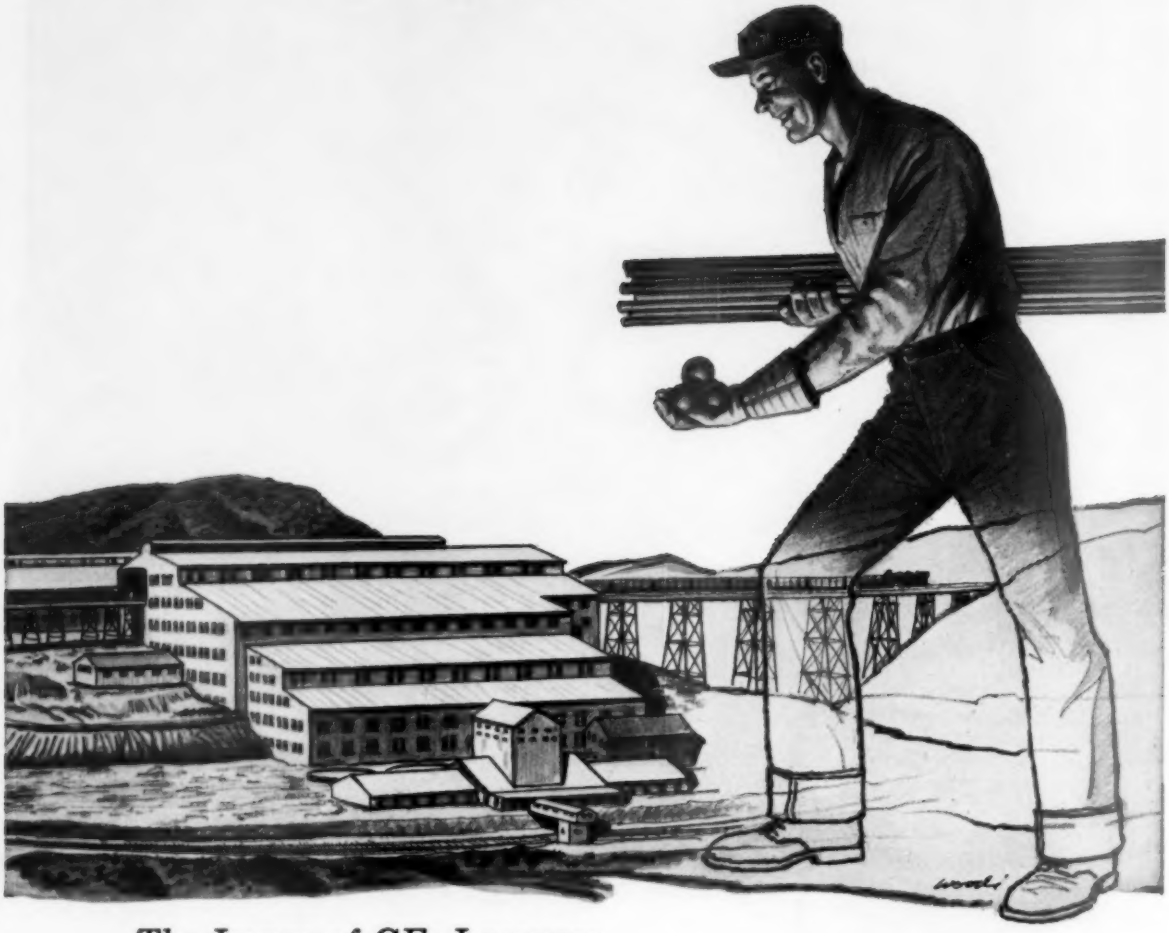

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quality steel Mining Products

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Ask your Allis-Chalmers dealer to show you **"And A Great Deal More"**

Longer-Reaching TRACTOLOADER Stays Back From Truck and Still Dumps Load Right in Center

There's reach to spare with a TRACTOLOADER. Note that this TL-20 is not even up to the body of this 12-ton truck — 8 feet high, 8 feet wide — yet it's dumping right in the center. No time-consuming loading from both sides . . . no pitching . . . no wasting time dozing to distribute material evenly — and no banging-up truck and loader.

In addition to extra-long reach, both the big TL-20 and TL-16 loaders, and the medium-size TL-14 have *exclusive* ONE-LEVER speed and direction control. Operator works fast because he goes into and out of *any* forward or reverse gear at will, while moving, with one lever.

To make your TRACTOLOADERS even more productive, you get bigger-than-ever carry capacity. The TL-20 carries 9,000 lb and has a 130-hp diesel engine. On the TL-16, you get 7,000-lb carry capacity and a choice of a 109-hp gasoline or a 104-hp diesel engine. The new TL-14 has 5,300-lb carry capacity and gives you either an 83-hp diesel or an 86-hp gasoline engine.

To further increase the efficiency of your work, each of these loaders has a whole family of buckets. You choose the size that is most suitable for your operating conditions and the materials you handle. Buckets range from 2¼ to 5 yd for the TL-20; 1½ to 4 yd for the TL-16; 1 to 3 yd for the TL-14.

Let your Allis-Chalmers dealer help you decide which TRACTOLOADER would be best for you. Start getting that extra reach and extra production now. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

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Yes, right here in the SECO plant, from drawing board to shipping dock, starts the dependability and screening efficiency that pays off when meeting rigid specifications.

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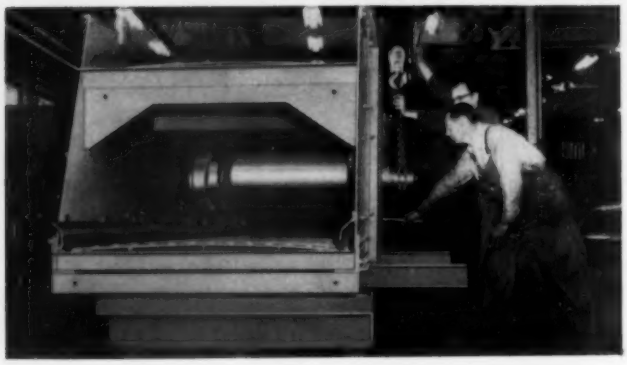

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And here's where SECO's superiority really pays off for you . . . on the job . . . up to 24 hours a day . . . year after year . . . meeting the most rigid specifications with precise sizing accuracy. It will pay you to take advantage of SECO's quarter century of vibrating screen experience.

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Buffalo 25, New York

SECO

VIBRATING SCREENS

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NEW U. S. PATENTS

(Continued from page 156)

Phosphate rock

2,869,997—In a method for making fertilizers containing 50 percent or more available P_2O_5, $CaHPO_4$ obtained from **phosphate rock** is reacted with lime and strong aqueous H_3PO_4 obtained by sulfuric acid digestion of additional ore (to S. Atkin. Assigned to Chemical Construction Corp.).

2,873,166—Liquid-liquid extraction of uranium values from the leached zone and phosphate matrix layers in the Florida pebble **phosphate rock** deposits (to W. R. Bowen. Assigned to U. S. Atomic Energy Commission).

2,867,522—Process for making fertilizers from sludges obtained during processing of **phosphate rock, sylvinite, dolomite, langbeinite, gypsum,** etc. (to L. H. Facer. Assigned to Glenn C. Cooley, Warren Dunham Foster and Halfdam Gregersen, as trustees).

2,868,618 — Treatment of Florida pebble **phosphate rock** ores to recover uranium, aluminum, phosphate and iron values. The leached zone, transition zone and matrix ores are slurried separately. The leached and transition zone materials are treated with a dispersant, and the plus and minus 200-mesh fractions recovered. The fines fractions are combined for further treatment, while the plus 200-mesh fraction is combined with the plus 200-mesh from the matrix slurry. (to F. N. Oberg and I. M. Le Baron. Assigned to United States Atomic Energy Commission).

2,879,152—Process for making a nitrogen-phosphate base fertilizer, starting with **phosphate rock** in an aqueous solution of nitric acid plus sulfuric acid. (to G. A. Coleman; assigned to Allied Chemical Corp.)

2,879,153—Process for manufacturing fertilizer from **phosphate rock,** nitric acid, ammonia, and potassium sulfate. (to F. T. Nielsson; assigned to Tennessee Valley Authority)

2,880,063—Manufacture of aqueous phosphoric acid from **phosphate rock,** whereby a virtually complete recovery of the P_2O_5 in the starting material is realized. (to A. Baniel and R. Blumberg; assigned to Makhtsavei Israel)

2,882,127—Production of agglomerated phosphate fertilizers, using Florida pebble **phosphate rock** as the starting material. (to I. M. Le Baron; assigned to International Minerals & Chemical Corp.)

2,883,266—Process for producing sodium silicofluoride from phosphoric acid derived from "wet process" acidulated **phosphate rock.** (to W. A. Hodges, J. E. Floyd and W. H. Lang; assigned to Swift & Co.)

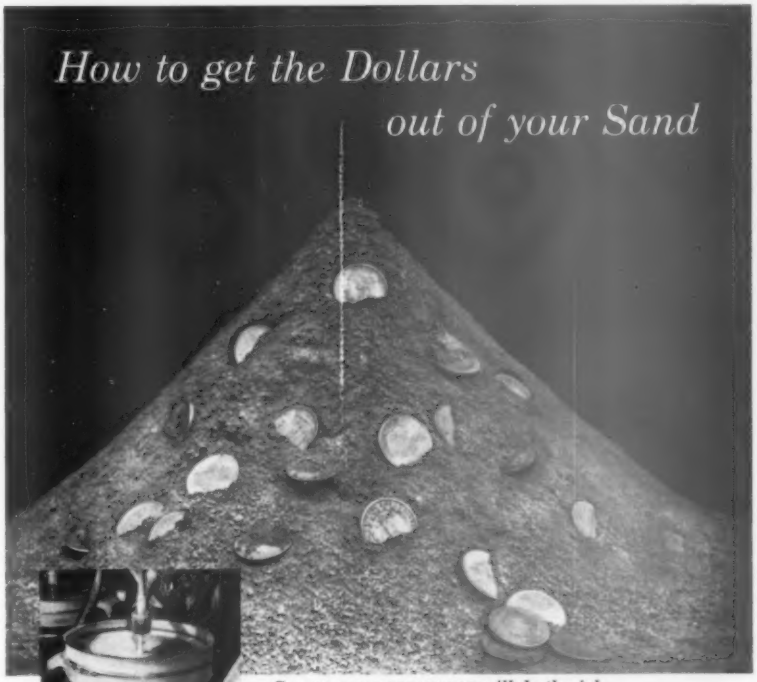
2,885,263-4—Methods of obtaining $CaSO_4$ and $CaSO_4 \cdot \frac{1}{2} H_2O$ of improved filterability derived during acid digestion of **phosphate rock.** (to R. B. Peet; assigned to Chemical Construction).

2,885,266 — Processing **phosphate rock** so as to eliminate impurities and produce a food grade H_3PO_4. The raw rock is solvent extracted. (to R. C. Vickery; assigned to Horizons Inc.)

Gypsum

2,888,359—Use of **asbestos** shorts, **gypsum** plaster, and precipitated chalk in a resin-base material for patching cavities in plywood. (to K. Jorgensen, R. M. Williams and L. S. Miller; assigned to American-Marietta Co., Adhesive, Resin & Chemical Div.)

(Continued on page 162)



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NEW U. S. PATENTS

(Continued from page 161)

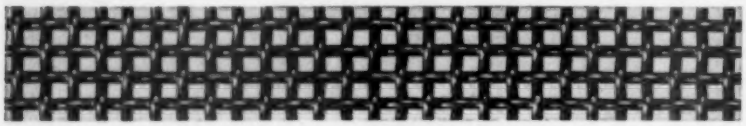
Slag, blast-furnace

British 813,084—Method of making high early strength cement from granulated **blast-furnace slag.** The mixture comprises about 4% anhydrous sodium sulfate, 2% hydrated lime, and 94% finely ground granulated blast furnace slag. If desired, the lime may be replaced by about 5% portland cement clinker. (assigned to Societe de Transports et d'Enterprises Industrielles [Sofina] Societe Anonyme, May 6, 1959)

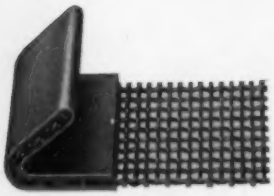
Fluorspar

2,886,411—In the manufacture of calcium carbide and calcium cyanide, alternate layers of **fluorspar** and a mixture of lime and coke are melted in an electric furnace. The fluorspar lowers the softening point and improves the nitrogen fixation of the carbide. (to F. Kaess; assigned to Suddeutsche Kalkstickstoffwerke A.G.)

2,890,129—Method for making a high quality synthetic gypsum cement from the calcium sulfate byproduct obtained during production of hydrofluoric acid from **fluorspar.** Aluminum sulfate is added, and the mixture steamed. (to H. G. Kaufmann)



TYLER SCREENS LAST LONGER

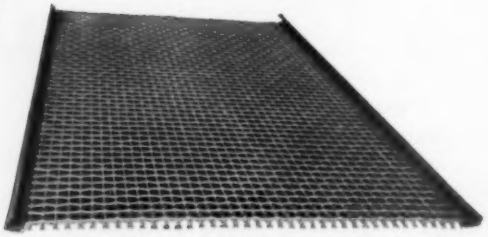


Tyler Type "AX" Hook Strip. For wire diameters from .047" to 5/16" inclusive.

Tyler Type "CX" Hook Strip. For wire diameters .041" and smaller.

Tyler Woven Wire Screens are woven with laboratory approved wires on precision machines. The high quality of Tyler Screens is apparent in their long life and service under the most difficult of screening conditions.

Tyler Screen Sections are furnished for all makes of vibrating screens in all meshes and metals. Each section is fabricated with the right type of edge or hook strip for the specification of screen cloth and to fit the particular make and model of screening machine on which it will be used.



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THE W. S. TYLER COMPANY
CLEVELAND 14, OHIO
Manufacturers of Woven Wire Screens and Screening Machinery

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Aggregates

2,878,131—In the making of a lightweight thermal insulating material, an aqueous slurry of expanded **perlite,** basic magnesium carbonate, **asbestos** and activated clay is filtered, and the filter cake fired to about 220 deg. F. The resulting product has a density of about 6 lb. per cu. ft. (to H. H. Houston and L. S. McCollum; assigned to International Minerals & Chemical Corp.)

2,880,456—Apparatus for frothing **blast-furnace slag** or the like, whereby the degree of expansion may be continually adjusted as the properties of the slag vary. Rounding and cooling of particles takes place on the surface of a truncated cone below the revolving disc. (to J. Kuzela and F. Vavrin)

2,870,039 — Method of forming sprayed insulating coatings on process equipment. A water-soluble, thermosetting resin is heated and sprayed through a stream of heated expanded **perlite,** exfoliated **vermiculite** or the like to project the material against a surface, whereon the resin polymerizes. Any desired thickness may be readily built up (to R. W. McReynolds. One-half assigned to A. R. Moulin).

2,876,197—Process for making a dry mix suitable for admixture with oil and water to form an oil-well emulsion drilling fluid. The mixture contains $CaCl_2$, expanded **perlite,** and an emulsifying agent, such as blown tall oil, ammonium lineolate, etc. The expanded perlite is crushed before being used. (to T. E. Watkins. Assigned to Socony Mobil Oil Co., Inc.)

2,877,135—A novel tile suitable for making sanitary stable floors comprises sawmill waste, **portland cement,** an aqueous alkaline earth metal salt, and an aggregate such as **blast-furnace slag, lava, pumice, silica sand,** or the like. (to K. Schwarzwalder and A. Wagner)

Mineral wool

2,882,552—Improved apparatus for fabricating fine-textured glass wool or **mineral wool** directly from a rotating body. (to R. M. Downey; assigned to: Midwest Insulations, Inc.; Industrial Products Co., Inc.; The Carney Co., and Airseal Insulations, Inc.)

2,884,659—Apparatus and process for producing **mineral wool** with high yield, in finer fiber sizes and with greatly reduced shot content. (to E. R. Powell; assigned to Johns-Manville Corp.)

BEMIS EXTENSIBLE MULTIWALLS...*THAT'S WHY!*

During the past twelve months,* Bemis has delivered more multiwall bags to the cement industry than in any similar period in its history.

*Period ended June 30, 1959

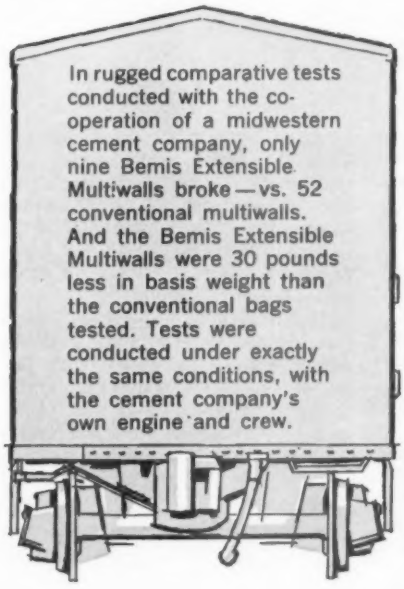
why?... BEMIS EXTENSIBLE MULTIWALLS!

And during this same period, cement plant management and packhouse crews, traffic men and building materials dealers, have noticed reduced bag breakage all along the line.

why?... again, BEMIS EXTENSIBLE MULTIWALLS

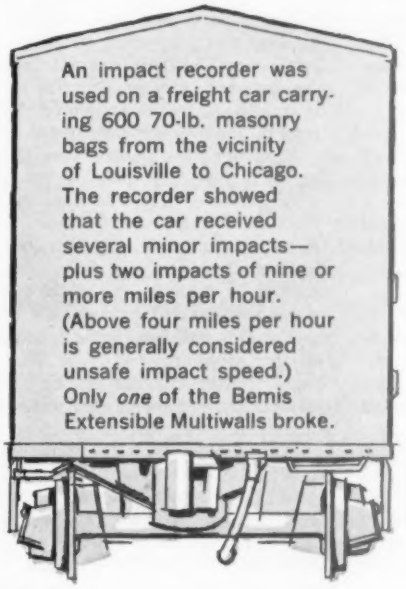
These bags, made of revolutionary "stretch" multiwall kraft paper with traditional Bemis skill, have performed amazingly well.

for example:



In rugged comparative tests conducted with the co-operation of a midwestern cement company, only nine Bemis Extensible Multiwalls broke—vs. 52 conventional multiwalls. And the Bemis Extensible Multiwalls were 30 pounds less in basis weight than the conventional bags tested. Tests were conducted under exactly the same conditions, with the cement company's own engine and crew.

another case:



An impact recorder was used on a freight car carrying 600 70-lb. masonry bags from the vicinity of Louisville to Chicago. The recorder showed that the car received several minor impacts—plus two impacts of nine or more miles per hour. (Above four miles per hour is generally considered unsafe impact speed.) Only *one* of the Bemis Extensible Multiwalls broke.

and in tests . . .

covering actual shipments made over a period of six months with the cooperation of nine eastern cement companies, Extensible Multiwalls outperformed conventional multiwalls by a substantial margin, even though they were from 11.7 per cent to 16.6 per cent less in basis weight.

If you haven't tested these rugged bags in your plant, call your Bemis man today.

why?

BEMIS EXTENSIBLE MULTIWALLS

—your best package for cement and related products

BEMIS

Where flexible packaging ideas are born

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NEW MACHINERY

Inexpensive method analyses consolidation of overburden

A NEW PROCESS of seismic analysis has been developed. It is a quick, easy and inexpensive method of determining the consolidation of overburden in surface mining operations.

It involves use of a refraction seismograph which measures the over-all consolidation of subsurface materials. Based on the principle that sound or shock waves travel through different subsurface materials at varying speeds and along different paths, rock hardness, stratification or lamination, fracturing or jointing and the degree of weathering or decomposition can be determined. It also is possible to determine the thickness of various layers of subsurface materials to depths exceeding 100 feet.

Equipment needed is an 8-pound sledge hammer, a small steel plate, a coil of wire, a geophone receiver, the refraction seismograph and a set of tables. Two men with a minimum of training can perform a complete seismic study in a matter of hours.

By this method the surface mine operator can determine rippability of the overburden material. He can tell if the material can be 'dozed and scraper-loaded, or ripped and scraper-loaded, or if it must be drilled and blasted for shovel loading.

A seismic wave is produced by the sledge hammer striking a steel plate at various distances from a geophone receiver. The receiver is sensitive only to the first seismic wave that reaches it. The seismic wave that travels the shortest path or one that travels over a longer path, but which includes a high-velocity segment, triggers the geophone. The time interval between the hammer blow and receipt of the seismic wave at the geophone can be read directly on the instrument panel.

Spacing of the seismic wave sources at 10-ft. intervals permits the construction of a graph of time vs. distance. The slopes of the various segments of the curve represent the velocities of the seismic wave through each layer. Velocity (V) of the seismic wave is found by the formula $V=D/T$ where D is the distance from the plate to the geophone and T is the time lapse. These velocities can be used to determine rippability of subsurface materials.

Actual analysis of the materials on a job is simple. From 20 to 30 minutes are required to run each test and to determine seismic wave velocities. A comparison of the wave velocities with those obtained in the same materials on prior jobs will give a good indication of the ripper performance and production that may be expected. On the jobs where this procedure has been followed and where the results have been observed, the determinations of rippability have been remarkably accurate, the manufacturer's engineers report.

In field operation, the materials must first be classified as to composition, such as caliche, limestone, sandstone or shale. Physical properties of different rocks vary in respect to their rippability even though velocities of sound waves through them are almost identical. Such classification usually is readily provided by a minimum amount of core drilling, observation of existing highwalls or outcroppings, or a general knowledge of geology in the area.

In addition to determining the degree of consolidation, or rippability, of each layer, it also is possible to determine the depth of each layer. This is an added bonus to the engineer or operator who usually is very interested in knowing how much of a particular material is under the surface. Depth is determined by a simple equation based upon the seismic wave velocities and the distance from the geophone where the velocity change occurs:

$$D = \frac{Xc}{2}\left(\frac{V_2 - V_1}{V_2 + V_1}\right)^{1/2}$$

where D is depth, Xc is the distance along the bottom of a graph from zero to the intersection point of the line, V_1 is the velocity of the seismic wave in the upper layer, and V_2 is the velocity wave in the next lower layer. Depths of successive layers are determined in similar fashion.

The refraction seismograph, therefore, accurately determines both the consolidation or rippability of the layers of subsurface materials and the thickness of the layers as well. *Caterpillar Tractor Co., Peoria, Ill.*

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Bin and hopper vibrator

A HIGH-AMPLITUDE vibration inducer, which starts and keeps materials moving during the unloading of railroad cars or hoppers, has been introduced. Called the Vibrolator CCVP, the unit is portable with its own mounting clamp and can be mounted in any position or angle convenient to the job.

The Vibrolator CCVP is pneumatically-driven, starts and operates with minimum air at any angle. It is shockproof and spark-proof. *Martin Engineering Co., Neponset, Ill.*

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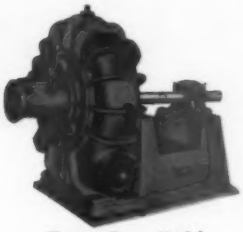
(Continued on page 168)

Ex-cowboy lays down his lariat!

Old Indian Fighter Sam Sanders, Drops His Six-shooter To Boast About His

THOMAS
DREDGE PUMP

Sam Sanders, former cowboy in old Indian Territory, now a prominent sand and gravel producer of Portales, New Mexico.



Thomas Pump Model (Series JL) which Mr. Sanders now uses.

Sam Sanders' sand and gravel dredge on man-made lake, largest body of water within radius of 125 miles.

On a man-made lake, in the treeless, arid, mesquite-covered high plains of eastern New Mexico (elevation approx. 4,000′) Sam Sanders—Sand & Gravel Company, since 1954 has operated a 10″ discharge Series JL Thomas DURABLE Dredge Pump. Mr. Sanders' sand and gravel business is a very substantial operation, supplying aggregate materials to a large area.

"I am enthusiastic about my Thomas Pump," states Mr. Sanders. "My Thomas Pump experience of nearly 5 years proves conclusively that its working parts have amazing long life against abrasion wear, resulting in low maintenance cost, less downtime for repairs, and excellent service from the Manufacturer. I am now planning to install another Thomas pump to replace my booster pump of a different make."

Mr. Sanders' experience again proves that "You cannot buy at any price a more durable pump for sand and gravel—you cannot buy one that will make you as much money." (Range of sizes is from 6-inch to 16 inch.)

THOMAS FOUNDRIES Inc.

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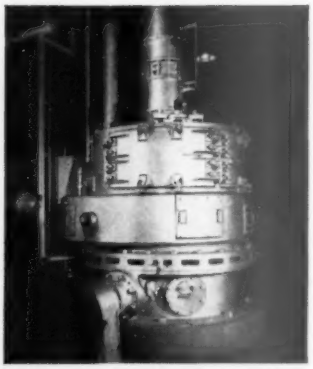
B&W Pulverizer Fires 12 x 450 Ft. Kiln Efficiently, Dependably

Unit Pulverizes from 204 to 216 Tons Daily of Coal Containing as much as 12% Moisture

A B&W EL Type Pulverizer enables the Cape Girardeau Plant of the Marquette Cement Manufacturing Company to direct-fire continually one of the largest kilns in the industry. They operate their pulverizer on a 24-hour day, 7-day-week basis and meet all production requirements. And — after well over two years of rugged grinding service this sturdy pulverizer has never caused an unscheduled plant shut-down.

Throughout the cement and rock products industry, performance records like that turned in at the Cape Girardeau Plant, have earned B&W Pulverizers a reputation for dependable, efficient, and economical grinding service. If you're thinking of building a new cement plant or perhaps modifying your existing facility, a B&W Pulverizer can help you cut operating costs and improve over-all plant efficiency. For the complete story, get in touch with your local B&W representative, or write The Babcock & Wilcox Company, Boiler Division, Barberton, Ohio.



B&W EL Type Pulverizer at Marquette Cement Manufacturing Company has ground an average of over 72,000 tons per year since its installation. No unscheduled shut-downs required for maintenance.

C-220

B&W

THE BABCOCK & WILCOX COMPANY

BOILER DIVISION

Enter 1092 on Reader Card

Competitive Test Proves...

PAYLOADER® Performance Best*

At Corder Sand and Gravel:

Base materials for this operation near Dallas, Texas, are taken from the Trinity River bottom. They use the versatile Model H-70 "PAYLOADER" tractor-shovel to stockpile sand and gravel, load trucks, grade roads and, in addition, do a lot of miscellaneous lifting and carrying chores.

* Owner John Corder says:

"This is the loader I've been looking for since I went into this business. We bought the H-70 following a competitive demonstration that proved its superior performance. It has everything — 4-wheel drive with no-slip wheels for the soft, wet conditions we have in the river bottoms, a powerful engine for speed, heavy duty digging and power to get us through deep powdered blown sand. I am very pleased with the H-70 and find new uses for it every day."

Four 4-Wheel-Drive Models:

Like the H-70, all 4-wheel-drive "PAYLOADER" models are built to outperform any other tractor-shovel of comparable size. They feature the famous Hough 40° roll back bucket action at ground level, "no-stop" power-shift transmission, power-transfer differential, planetary final drives, power steering and 4-wheel power or air brakes. There is a "PAYLOADER" size to fit the requirements of your plant too — sizes up to 12,000 lb. carry capacity. Contact your Hough Distributor and let him match the efficient operation of a "PAYLOADER" to your job.

NEW LITERATURE

. . . is available without obligation showing the complete "PAYLOADER" tractor-shovel line and the many useful attachments available for each model.

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
705 Sunnyside Avenue
Libertyville, Illinois

☐ Send "PAYLOADER" line literature

Name _____

Title _____

Company _____

Street _____

City _____ State _____

8-B-6

Enter 1102 on Reader Card

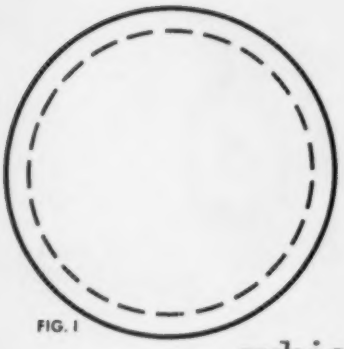


FIG. 1

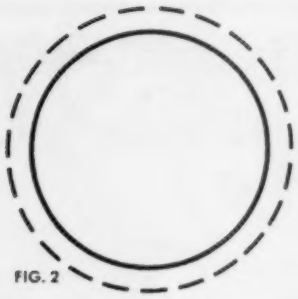


FIG. 2

which dotted circle is the larger?

Your eyes tell you that the dotted circle in figure 1 is greater in diameter than figure 2. Actually, the figures are of equal diameter.

Many of us are fooled by an illusion of another sort; the illusion that all crusher replacement parts are of equal value. This illusion can lead to one of the most costly investments one can make.

You can prove this to yourself by ordering Columbia Armor-Tough Manganese Steel replacement parts. Then COMPARE the cost of down time, the cost per ton, the cost per week of service. No matter how you measure it, you will find that Columbia crusher components are your best investment . . . because Columbia parts are "beefed up" where it counts, where rock meets metal.

Don't be fooled by the value illusion. Insist on the savings that only extra Columbia quality can assure you.

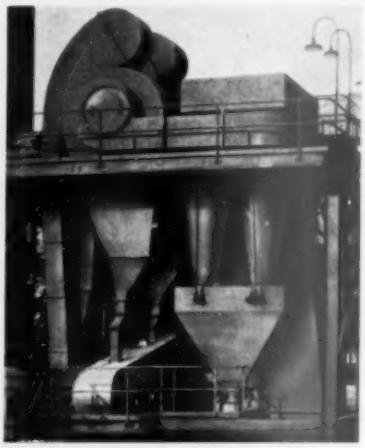
Send for the new illustrated Columbia Bulletin No. 1063, featuring crusher, tractor, shovel, bucket replacement parts.

CRUSHER JAW
SMOOTH ROLL SHELL
7 FT. BOWL LINER
Columbia
COLUMBIA STEEL CASTING CO., Inc.
933 N. W. Johnson, Portland 9, Ore. • Ph. CA 7-0555

Enter 1015 on Reader Card

NEW MACHINERY

(Continued from page 164)



Classifying system

A NEW CENTRIFUGAL CLASSIFIER system which separates dry fines from coarse materials has no moving parts, requires little maintenance, and utilizes only 0.04 to 0.5 hp. per ton per hr. The classifier, recommended for ground limestone, lime, sand, cement, etc., attains high operating efficiencies by utilizing a unique combination of aerodynamic forces in obtaining virtually complete separation of fines from larger material. For example, the classifier will extract from most feed materials more than 98 percent of particles having diameters smaller than 325 mesh (44 micron), with no oversize material in the fines. In initial installations this performance is said to have increased mill outputs from 10 to 300 percent.

In operation, feed material and gas, usually air, enter the classifier through a sharp bend at the top, and air and feed are separated by centrifugal force, the air stream passing behind a baffle plate against which the feed material slides. The air stream then crosses the curtain of feed material resulting in an intense scrubbing action separating fine particles from tailings, breaking up agglomerates and subjecting all particles to an equal drag force. Very large particles, if present, are immediately precipitated by gravity to the bottom of the classifier.

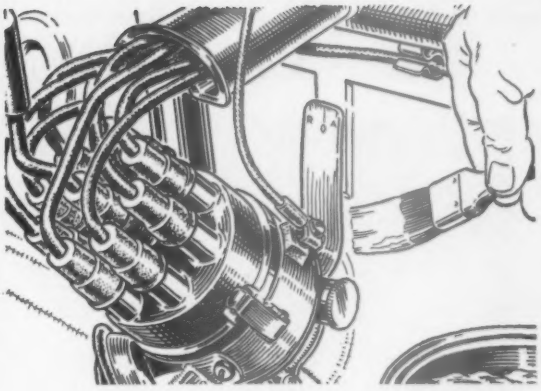
The classifier is available in sizes to handle from 100 lb. to 100 tons of feed material per hour and is particularly recommended for classification applications in the 400 to 200-mesh range. *Buell Engineering Co., Inc., 123 William St., New York, N.Y.*

Enter 102 on Reader Card

(Continued on page 170)

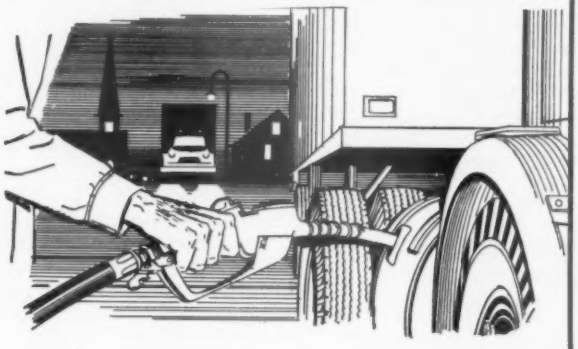
LUBE LOGIC

These sure-money "SLEEPERS" can stop the clock on maintenance time



WATERPROOFED IGNITION MAKES STARTING EASIER

Are your batteries showing the strain of a heavy foot on the starter on damp days? Get your TAE* to show you how to waterproof ignitions with Texaco Rust-proof L. It's a simple, five minute job that pays off with months of faster starts.



HOW TO KEEP CONDENSATION OUT OF YOUR TANK

Condensation in your fuel tank can make even the best gasoline sound like you were robbed. One way to avoid it is to fill your tank in the evening—when it's cool and the gas has contracted to minimum volume—and *keep* it filled overnight. This cuts down the possibility of condensation by reducing air volume.

TRUCK RECORD FOLDER

Sturdy manila folders designed to help you keep tabs on mileage, oil changes, lubrication, tire life, batteries, etc., is yours for the asking. Tell your TAE* how many you need: or write direct.

*TEXACO AUTOMOTIVE ENGINEERS

Every month or so we'll bring you a batch of "sleepers"—little angles, so easy to overlook, where big savings in time and money can be made. But month in, month out, your local Texaco Automotive Engineer is the best source of money-saving lubrication ideas. Don't forget that "Lubrication is a major factor in cost control." Texaco Inc., 135 East 42nd St., New York 17, N. Y. Dept. RP-11.

Enter 1040 on Reader Card

NEW MACHINERY

(Continued from page 168)

Bag sealer

AN ELECTRIC HEAT-SEALING unit designed to close a polyethylene-lined multi-creped kraft bag has been developed. These bags are widely used to package ammonium nitrate-fuel oil mixtures for industrial blasting. The unit was especially developed to seal a new waterproof explosives bag recently introduced.

The heat-sealing unit weighs only 25 lb. and operates on a 110-v. electrical system. A three-quarter inch seal is formed through the sheets in five sec. The 750-w. heating element is thermostatically controlled and operates at 380 deg. F. *Bemis Bag Co., 305-27th Ave. N.E., Minneapolis 18, Minnesota.* **Enter 103 on Reader Card**

Drying, heat conditioning unit

A NEWLY DESIGNED feeder-heater unit for heat treating or drying granular or finely divided materials has been developed. The new Model B Feeder-Heater Unit combines mechanical and combustion principles to provide simplified heat treatment between 400 and 2,400 deg. F. Many types of ores, vermiculite and perlite ores for lightweight aggregates, limestone fines and similar materials can be handled. This unit is available in several capacities up to 4,000 lb. an hr.

Material to be heated is fed continuously through the unit by a short screw feeder. It then is picked up by combustion air and carried through a stable flame where it is heated while in suspension. The mixture of heated material, flame and products of combustion is directed through the refractory-lined tubular furnace. The material drops out by gravity, with the gases going through a cyclone for cleaning.

The feeder-heater unit can also be used with various types of new and existing furnaces, can be mounted horizontally and fired through the furnace wall. *Steel Processing Div., Fort Pitt Bridge Works, 212 Wood St., Pittsburgh 22, Pa.*

Enter 104 on Reader Card

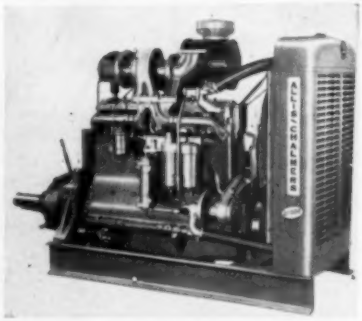
Non-rigid belt conveyor

A NEW NON-RIGID, non-spilling, portable belt conveyor with a broad range of industrial and agricultural applications has been introduced. Designated the Lo-Rope, it is said to provide large capacity, easy installation and low operating and maintenance costs.

An outstanding feature of the new conveyor is its exclusive idler mounting with the idler positioned above the rope side frames. This type of mounting, according to the manufacturer, automatically centers the load, eliminates spillage, and—combined with the deep 27-deg. troughing of the belt itself—greatly increases its carrying capacity. *The Long Co., Oak Hill, West Virginia.* **Enter 105 on Reader Card**

Heavy-duty diesel engines

TWO NEW heavy-duty diesel engines are being marketed. One, the 21000, is turbocharged and develops 340 hp. at 2,000 rpm. The other is identical except that it does not employ the supercharger. Designated the 16000, it develops 230 hp. at 2,000 rpm. Both are 6-cyl., 4-cycle in-line engines. Displacement is 844 cu. in. and weight, 3,000 lb.



The engines have a high-turbulence combustion chamber. At the instant of peak turbulence, a multi-jet fog of diesel fuel is injected at high pressure downward into the vortex of hot swirling air, thus burning the fuel completely. This feature is said to give quick, easy starting, even in cold weather, fast acceleration and low fuel consumption.

The maker's HD-21 and HD-16 crawler tractors and TS-260 graders are now equipped with the power plants. They are also available in 130 to 200-kw. standby generator sets and for other heavy-duty uses. *Allis-Chalmers Manufacturing Co., Milwaukee, Wisconsin.* **Enter 106 on Reader Card**

Short circuit protection

POSITIVE PROTECTION against ground faults and short circuits on any and all dc. operated off-track machines and their trailing cables is now possible for the first time, according to the manufacturer. Known as the Lectronic Sentry, the two-part unit consists of transmitting and receiving elements. Whenever the continuous monitor signal of the sender (attached to the equipment) is interrupted, the receiver (part of automatic circuit breaker at outby end of cable) acts instantly to remove power completely.

The Lectronic Sentry quickly and safely prevents the energizing of equipment whenever a dangerous condition exists. This may be a ground fault in the machine itself, a short circuit in the machine or its trailing cable, or a broken or open cable conductor. The sentry is able to distinguish between normal conditions of overload and potentially dangerous short circuits.

The U.S. Bureau of Mines has accepted the unit for use on permissible equipment. It is designed to be failsafe. *Electrical Products Div., Joy Mfg. Co., 1201 Macklind Ave., St. Louis, Mo.* **Enter 107 on Reader Card**

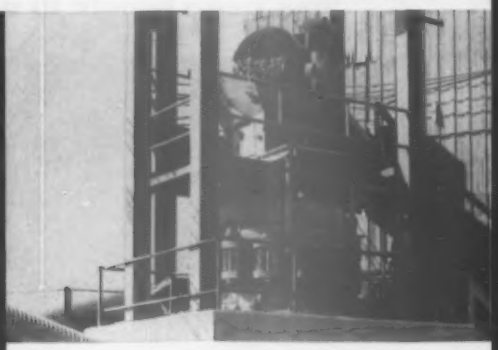
Aerosol belt dressing

A NEW BELT DRESSING in aerosol form, which can be sprayed on moving transmission belts, has been announced. Marketed under the tradename of Sprazon, the new belt dressing is said to be completely safe, since workmen's hands and arms need never be in the way of moving belts or pulleys. Spray is applied while drive is running, and the rotation of the pulley transfers the film to the inner surface of the belt. Sprazon can be used on Vee, rubber, fabric or leather belts. *Graton & Knight Co., Worcester 4, Mass.* **Enter 108 on Reader Card**

(Continued on page 176)

Enter 1016 on Reader Card

BIG TONNAGES of quality aggregate produced at low cost with SYMONS® Cone Crushers



for STATIONARY service . . . Symons Cone Crushers are built in Standard, Short Head, and Intermediate types, with crushing heads from 22" to 7' in diameter—in capacities ranging to 900 or more tons per hour, for primary, secondary and finer reductions.

for PORTABLE service . . . Symons Cone Crushers are being used in increasing numbers for portable and semiportable crushing plants. Illustrated is a typical Cedarapids® Intermediate Scalping Unit, using a 4-ft. Symons Cone Crusher. Unit is serving a large Midwest sand and gravel producer.

Typical of today's modern highway construction is this view of the modern Freeway in Oakland, California, showing three levels of highway structure over two levels of railroad.
(Photo courtesy California Division of Highways)

C-159

The big tonnages of specification aggregate, bituminous mixes, crushed sand and cement required to meet the ever-increasing needs of the construction industry are produced by Symons Cone Crushers at low cost. Good reasons why these efficient crushers are the leading choice of producers and contractors building highways, dams and hydro projects, bridges, as well as commercial building construction.

It will pay you to specify and use Symons Cone Crushers for both stationary and portable service. *Write for descriptive literature.*

NORDBERG MFG. CO., Milwaukee 1, Wisconsin

NORDBERG MACHINERY

NORDBERG

SYMONS . . . a registered Nordberg trademark known throughout the world

ATLANTA • CLEVELAND • DALLAS • DULUTH • HOUSTON • KANSAS CITY • MINNEAPOLIS • NEW ORLEANS • NEW YORK • ST. LOUIS
SAN FRANCISCO • TAMPA • WASHINGTON • TORONTO • VANCOUVER • JOHANNESBURG • LONDON • MEXICO, D. F.

A thunderstorm three miles away

has been known to detonate a blast prematurely

For best protection against stray electric currents

You need not worry about stray electrical currents when you can hook-up and detonate with Primacord! It acts as the detonating agent throughout the entire column of explosives, or furnishes initiation to primers. This use of Primacord will result in safer, easier, quicker loading. Primacord also connects all holes, providing positive initiation, with results that you should find profitable.

When your blast is loaded and hooked up, it cannot be set off by normal vibration or friction, ordinary impact or sparks, *or stray electrical currents.* Even a direct hit by lightning failed to detonate Primacord. It must be detonated with fuse and cap or electrical blasting cap. This will be the only cap on the job, put on only when you are ready to blast.

ENSIGN-BICKFORD PRIMACORD® DETONATING FUSE

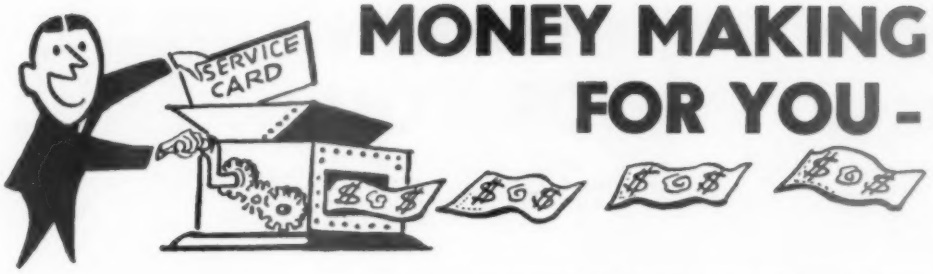
Attach blasting cap to PRIMACORD when ready to blast.
Use fuse and cap wherever stray currents are suspected.
Prime and hook-up all holes with PRIMACORD.

The trunk line illustrated is Lo-Temp® Primacord. For further information see your explosives supplier or write to

THE ENSIGN-BICKFORD COMPANY

Simsbury, Connecticut • Since 1836

Enter 1093 on Reader Card



MONEY MAKING IDEAS FOR YOU - - - FREE

USE THESE CARDS FOR MORE INFORMATION ON:

1. **Advertised Products**
2. **New Machinery**
3. **New Literature**

How to use:

Each advertisement in this issue is provided with a key number, so is each new machinery and new literature item. For more information on any of these items simply fill in the key numbers in the appropriate space on the adjoining card and send it to us. We'll do the rest.

BUSINESS REPLY CARD
No Postage Stamp Necessary If Mailed in the United States

FIRST CLASS
PERMIT NO. 1417
CHICAGO, ILL.

– POSTAGE WILL BE PAID BY –

ROCK PRODUCTS
79 WEST MONROE ST.
CHICAGO 3, ILL.

READER-SERVICE CARD RP-8-59

ROCK PRODUCTS
79 W. Monroe St.

AUGUST, 1959
Chicago 3, Illinois

Cannot be serviced after October 1, 1959 postmark.

Please print or type

Name_____ Position_____

Company (In Full)_____

Company Address_____ City_____ Zone_____ State_____

MAIN PRODUCT OF PLANT_____ CAPACITY_____

[THIS INFORMATION WILL HELP US GIVE YOU MORE COMPLETE SERVICE.]

Send information on items identified by key numbers beside or below items of interest to you. List your choice in numerical order. Limit 10 per card.

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IF NO KEY NUMBER, USE COMPANY NAME

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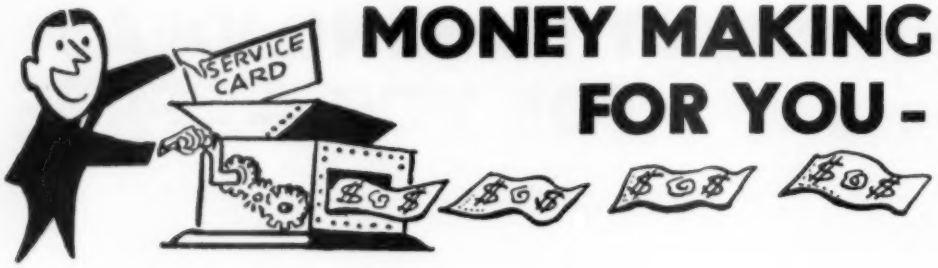

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(6) ..... (7) ..... (8) ..... (9) ..... (10) .....

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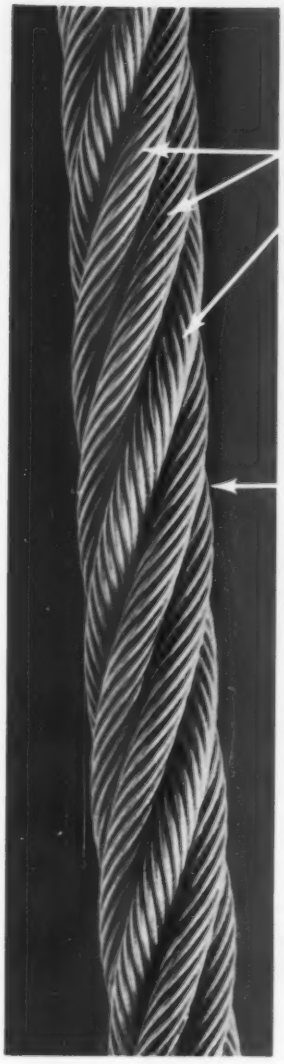


Herringbone's two pairs of Lang lay strands and one pair of regular lay strands provide the ideal combination of maximum flexibility with good stability.

Finer wires inside contribute to Herringbone's excellent drum-winding characteristics.

Heavier outside wires in each strand have greater resistance to abrasion.

"...and it has a much longer life"

GASKILL CONSTRUCTION COMPANY

The above quote is one of the things that Gaskill Construction Company says about the new Roebling Herringbone* Wire Rope. There are further quotes: ". . . We, after giving your Herringbone cable a great deal of use, find that it is far superior to any other cable and it is much more economical."

These are *user* statements about the newest design development in wire rope in many years. Herringbone is the regular lay and Lang lay wire rope. It is two-ropes-in-one rope, with the best features of each in combination. It has been used, with the same success quoted here, on a wide variety of machines as well as on tough hoisting jobs. Its potential is virtually unlimited wherever all-steel ropes are specified and on most installations where fiber core ropes are standard.

Your Roebling Distributor has full details on Herringbone, or contact Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

*Reg. App. For

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

Enter 1103 on Reader Card

NEW MACHINERY

(Continued from page 170)

Bulk transport trailer

A NEW, SELF-UNLOADING dry bulk materials transport highlighted a series of 14 new model trailers and truck bodies recently introduced. Although designated as Cement Transport Model BMC-T, the new unit also cuts time and costs in hauling chemicals, fertilizer and other dry bulk materials. It is available in a wide range of capacities and lengths.

The BMC-T has three 20-in. fill hatches with water-tight covers. Its twin screw discharge system unloads at the rate of 5 bbl. per minute. To dislodge lumps and prevent bridging over conveyor shields, the screws are reversible and each has four air pads. Two-stage drives permit discharge of the rear portion of the load before front screws are engaged.

The unit is hydraulically powered through a tandem pump operated from the tractor power take-off. With a 25-hp. air-cooled engine, offered as optional equipment, it can operate with any tractor. *Dorsey Trailers, Elba, Ala.* **Enter 109 on Reader Card**

New 2½-cu. yd. shovel

NEWEST ADDITION to a line of power cranes and excavators is the Model 3100, a 2½-cu. yd. shovel which is easily converted to clamshell, back hoe, dragline or crane. Although big in capacity, the machine travels and can be moved from job to job with small-machine ease. For movement by truck or train, complete crawler assemblies are easily removed, bringing width and height well within ordinary shipping clearances.

Greatest shovel boom strength is obtained through the use of an exclusive alloy steel boom welded in elongated tubular form. The crowd mechanism of the 3100 is carefully positioned to eliminate off-center strain on the drum shaft. A powerful, smooth disc-type clutch on main drive shaft powers the high-speed retract. *Manitowoc Engineering Corp., Manitowoc, Wis.* **Enter 110 on Reader Card**

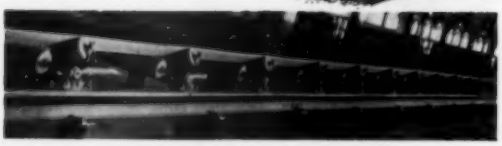
Disposable filter

REFILLS FOR FACE MASKS are now packaged in a new self-dispensing container. The container allows the easy, quick removal of the refills without touching any but the single filter being put to use. *General Scientific Equipment Co., Limekiln Pike and Williams Ave., Philadelphia 50, Pa.*

Enter 111 on Reader Card

(Continued on page 180)

Profitable **MATERIAL HANDLING** *with* **EHRSAM**



BELT CONVEYOR

The Ehrsam line of Conveyor Rolls fills a definite demand for a conveyor that will combine dependable high performance with low maintenance cost for maximum profit. Ehrsam Conveyor Rolls are available in any belt widths with many styles and heights. For additional information write Department B for your catalog 2-A.

TRIPPERS

The Ehrsam Tripper is designed for top performance. It is easily serviced. Most working parts are accessible, yet protected for the operator's safety. All spouting is engineered to give full capacity discharge. Many styles of trippers are available, and can be designed to suit your special application.

The J. B. Ehrsam and Sons Mfg. Co.
Enterprise, Kansas

KANSAS CITY, KANSAS
PHOENIX, ARIZONA

REPRESENTATIVES:

EHRSAM PACIFIC, INC. — SAN FRANCISCO, CALIFORNIA
WILKS-BERMEL CO. — LANCASTER, NEW YORK
THOMER EQUIPMENT CO. — MINNEAPOLIS, MINNESOTA

Enter 1017 on Reader Card

"My Boss Read the Specs with Tears in His Eyes"

He looked like he'd lost his best friend — money.

"Goodbye contract," he said quietly. "We just can't hope to meet these government specifications for aggregate."

"Yeah, it's pretty hopeless with our set-up. Of course, if we had a hydraulic classifier — " (I was kidding.)

"You're out of your mind. Around here water costs more than sand."

"Well how about an air separator, like Sturtevant makes?" I shot back. "Pete's brother runs a pit at Rapid City and says they clean sand without water. By de-dusting it."

He was skeptical. "Aren't Sturtevants for cement?"

I nodded. "They are, but you see quite a few in aggregates, too, nowadays. Might be worth a try."

The Boss smiled for the first time that morning. "What the heck are you waiting for? Get 'em on the phone and let's see what they can do."

So we got the contract, thanks to the 12 ft. Sturtevant we now use for de-dusting and pre-classification. It's a beaut. Gives good service outdoors the year round, with no protection except for the motor housing.

If you're in this business, Brother, it might pay you to have a good long look at what a Sturtevant can do for tight aggregate specifications.

Sturtevant Air Separators classify production loads up to 150 tph by exact control of air currents and centrifugal force. Simple, quick adjustments make possible the selection (or rejection) of particles in the 30 to 400 mesh range. Nine standard models available, varying in size from 3′ to 18′.

Learn how a Sturtevant Air Separator can help your aggregates production. Write today describing your needs. Address: Sturtevant Mill Co., 102 Clayton St., Boston 22, Mass.

STURTEVANT AIR SEPARATORS CLASSIFY SAND WITHOUT WATER

PRODUCING CLEAN SAND, the Sturtevant acts as a de-duster by removing fine mesh particles from the throughput. Particularly valuable where water is limited.

EASING SCREEN LOADS, the Sturtevant rejects unwanted fines and circuits coarser sizes to screens for grading. By this pre-classification, the possibility of blinding screens with fines is minimized and output considerably increased. Also, excessive dust problems are eliminated.

WHEN BLENDING IS NECESSARY, the Sturtevant selects fines from the crushing operation. This stockpiled product then can be used in the blending operation to overcome fineness modulus deficiencies.

GRINDERS
CRUSHERS
PULVERIZERS
MICRON-GRINDERS

STURTEVANT MILL CO.

Dry Processing Equipment

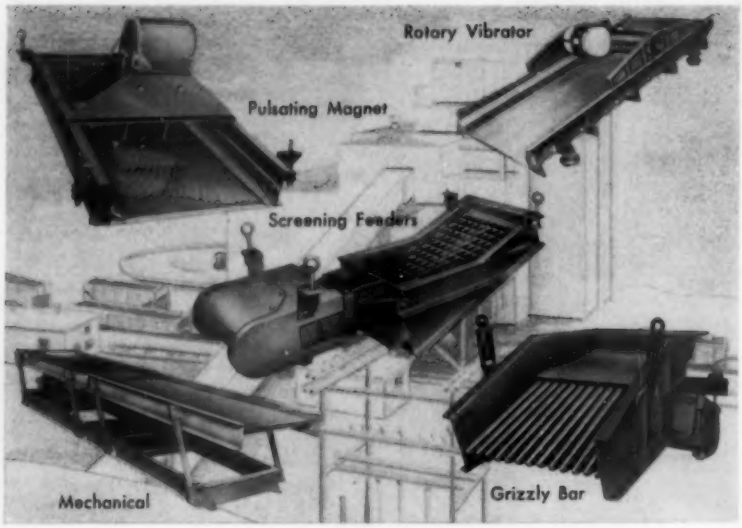
The "OPEN-DOOR" to *lower* operating costs over *more* years

MIXERS
BLENDERS
ELEVATORS
AIR SEPARATORS

Enter 1104 on Reader Card

SYNTRON

VIBRATING SCREENS



for efficient, dependable low cost scalping, sizing, dewatering or fine screening

SYNTRON builds a vibrating screen for every screening job from heavy duty scalping of rock to fine quality control screening of aggregates.

SYNTRON Vibrating Screens are built in a variety of styles—one, two or three deck models with drive units designed for each particular screen. Available in sizes ranging from 2 feet wide x 5 feet long to 6 feet wide x 14 feet long plus the 4 feet wide x 20 feet long conveyor screen.

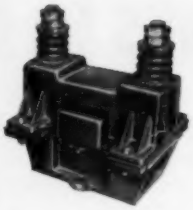
SYNTRON Screens provide uniform vibration, eliminating dead spots. Constant full screen efficiency provides more effective separation and higher capacity.

SYNTRON Screens combine efficiency, dependability and low maintenance to give better separation, greater tonnage at lower cost.

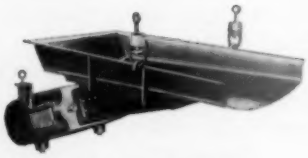
SYNTRON Screens are compact, easy to install, easy to maintain.

Write for complete information on all SYNTRON Screens

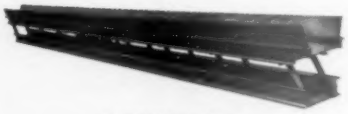
Other SYNTRON Equipment of proven dependable Quality



BIN VIBRATORS

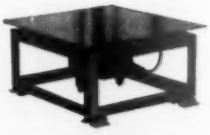


VIBRATORY FEEDERS



MECHANICAL VIBRATING CONVEYORS

ROTARY VIBRATOR CAR SHAKERS



VIBRATORY PACKERS & JOLTERS

SYNTRON COMPANY
450 Lexington Ave. Homer City, Penna.

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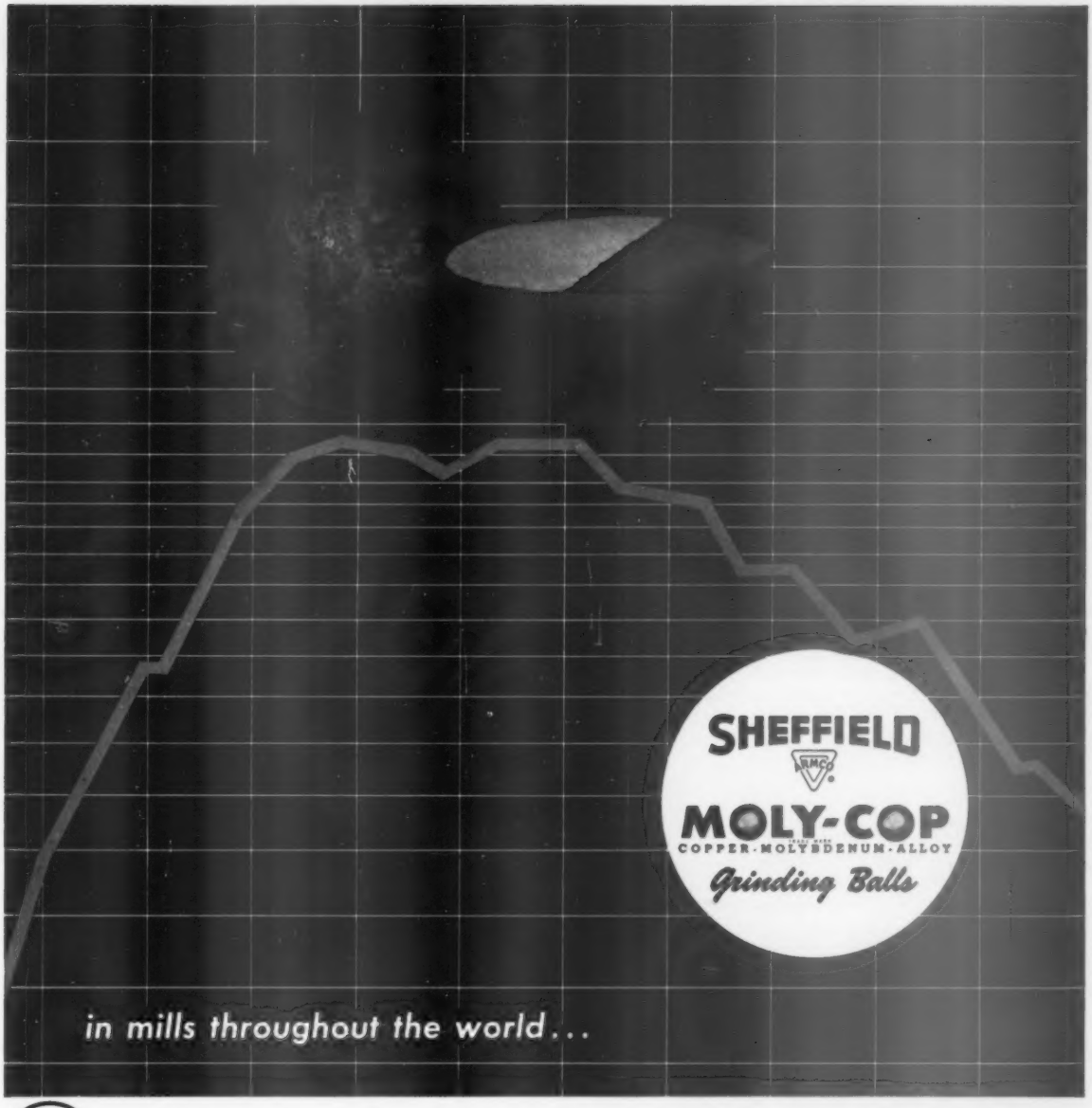


The Standard of Comparison for PEAK PERFORMANCE

In every product field there's an acknowledged leader—the standard of comparison against which all others are measured. In grinding balls, that standard of quality is Sheffield Moly-Cop. The reason: in performance tests by mill after mill, Moly-Cops give longer service, less down-time, and other production economies.

New steels are born at Armco

SHEFFIELD DIVISION

ARMCO STEEL CORPORATION

OTHER DIVISIONS AND SUBSIDIARIES: Armco Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation • Southwest Steel Products

Enter 1106 on Reader Card

NEW MACHINERY

(Continued from page 176)

Pneumatic vibrator

A MASSIVE new pneumatic vibrator delivering 16,000 lb. of impact has been made available. Used principally on vibrating tables, hoppers, large bins, railroad car shake-out, this 7-in. model FAC operates on 60 to 80 lb. of air pressure. The 176-lb. piston has 1¼-in. stroke. Vibrator speed and intensity can be varied according to needs, while unit can be rigged to operate continuously or intermittently. Reciprocating action of the piston is air cushioned for quiet operation on applications where noise is an objectionable factor. Entire weight of the unit is 539 lb. *The Cleveland Vibrator Co., 2828 Clinton St., Cleveland, Ohio.*

Enter 112 on Reader Card

Pneumatic powder loader

A PNEUMATIC DEVICE for loading field-compounded ammonium nitrate explosives is on the market. The new machine is said to combine the advantages of a low-cost explosive with fast, efficient hole loading. It also enables ammonium nitrate to be loaded easily into both small diameter and horizontal holes.

Basically a pressurized tank, the "Power Monkey" is expected to greatly reduce the amount of time required for hole-loading operations. A quantity of ammonium nitrate-fuel oil mixture is loaded into a hopper and then blown through a hose inserted into the blast hole. Stemming may also be placed in this manner.

The unit will be available in wheel or stationary-mounted models with hopper capacities of 6 (holds approximately 300 pounds), 15 or 28 cu. ft. *Industrial Chemicals Div., Spencer Chemical Co., Dwight Bldg., Kansas City 5, Mo.*

Enter 113 on Reader Card

New transmission

A FULLY AUTOMATIC truck transmission is now available. The name "ReoMatic" was selected for the popular, time-proved Allison transmission for medium and heavy duty vehicles in the Reo line.

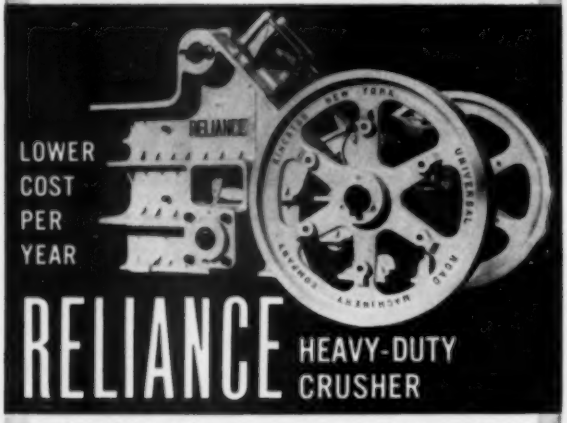
Known as the "transmission with the automatic brain," the ReoMatic incorporates a torque converter, constant mesh planetary gearing, hydraulic control system, hydraulic retarder and converter-driven power take-off positions.

Full power shifting with no interruption of power to the wheels is a feature of the constant mesh planetary gear train. There is no conventional disconnect clutch, no clutch pedal, no manual shifting, no clashing of gears. Shifting is fully automatic. *Reo Div., The White Motor Co., Lansing, Mich.*

Enter 114 on Reader Card

(Continued on page 182)

LEVER-TYPE JAW CRUSHER
STILL IN USE AFTER 36 YEARS
—at Keystone, So. Dakota



RELIANCE HEAVY-DUTY CRUSHER

- Heavier, stable—you save money on upkeep.
- Minimum abrasion — outlasts other designs 3 to 1.
- Long jaw plates — adjustable for fineness.
- Crushing, screening and washing plants—50 to 1,500 tons-per-day capacity —engineered to your needs.

Booklet on request, pictures installations.

UNIVERSAL ROAD MACHINERY CO.
Main office and factory: Kingston, N. Y.
New York City office: 117 Liberty St.

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HANCO
HEATED SCREEN
Attachments
Eliminate Cloth Blinding
On all types of Vibrating Screens
WRITE: F. R. HANNON & SONS
1605 Waynesburg Rd., S.E. Canton 7, Ohio
Cable address: HANCO

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Slurries...handled at lower cost

The new WILFLEY MODEL K Centrifugal Sand Pump embodies important mechanical improvements especially adapted to the handling of cement slurry and results in stepped-up production and substantial power savings. Individual engineering. Write for details.

A. R. WILFLEY and SONS, Inc.
Denver, Colo., U.S.A.

Buy WILFLEY for Cost-Saving Performance

WILFLEY centrifugal PUMPS

Enter 1050 on Reader Card

PORTER BROWN LIMESTONE COMPANY—

100% MURPHY DIESEL

Plant at Springfield, Tenn. . . . . 100% MURPHY POWERED

Plant at Oneonta, Alabama . . . . . 100% MURPHY POWERED

Owner Porter Brown and Superintendent William Boring . . 100% SOLD ON MURPHY DIESEL

Here's why Porter Brown Limestone Company, of Springfield, Tenn., *specifies* Murphy Diesel power when they buy crushing equipment—

"In view of Murphy's good service at our other plants, we specified Murphy power when we bought equipment for our Oneonta plant. Murphys are satisfactory in every way . . . especially for low operating costs and less maintenance. We're sold 100% on Murphy Diesel."

Porter Brown's plant at Oneonta (shown below) is averaging 1500 tons per day of 1¼" minus limestone. A 161 HP (continuous) Murphy Diesel powers the jaw crusher and vibrating grizzly in the portable primary, another 161 HP Murphy powers the cone crusher intermediate scalping unit, while a 107 KW Murphy Diesel-Electric Generator Set meets the electrical requirements of the plant.

Aggregate producers and contractors throughout the country are swinging to dependable, economical Murphy Diesels for both portable and stationary plant operations.

Your nearby Murphy Diesel Dealer will gladly help you "power for profit" with the size and type of Murphy Diesel you need.

For stationary installations, Murphy's steady, uniform power and low fuel costs assure efficient power for crushers, screens, conveyors, washing equipment, etc. And don't overlook the economy advantages of Murphy Diesels for generators, pumps, compressors, or for powering or re-powering shovels. 40SRO

MURPHY DIESEL

HEAVY-DUTY POWER for Rock

Murphy Diesel engines and power units are available in sizes from 96 to 264 H.P. with engine speeds of 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 64 to 165 K.W.

MURPHY DIESEL COMPANY

5315 W. Burnham St. • Milwaukee 14, Wis.

SALES — PARTS — SERVICE throughout the Nation

Enter 1107 on Reader Card

NEW MACHINERY

(Continued from page 180)

Lightweight crane

A NEW, VERSATILE, lightweight crane is available for truck mounting. Known as the Foco-Crane, it is a low-cost, simple unit which elevates, turns and extends hydraulically. A patented slewing gear provides positive, precise positioning of capacity loads, mounts in a 13-in. space between cab and truck bed, but telescopes and folds out of way when not in use.

Two safety valves prevent overloading; two hydraulic legs prevent tipping and stress on truck frame and springs. Control valve bank is so constructed that additional hydraulic circuits may be easily added to operate such boom accessories as hydraulic grabs, clamshell buckets and the like. The machine can lift up to 2.2 tons, to a height of 21 ft. with boom fully extended. *Focowil Corp., 79 W. Monroe St., Chicago, Ill.*

Enter 115 on Reader Card

Electronic weight detector

A NEW, ELECTRONIC weight detector for application to dial scales has been designed to provide the bridge between manually controlled and truly automatic weighing processes.

The new weight detector determines that the correct weight has been reached before allowing the weight to be recorded, read out equipment to be operated, or controls for conveyors, hoppers, mixers and other machinery to be operated. Thus correct weighing without visual observations is assured. *Fairbanks, Morse & Co., 600 So. Michigan Ave., Chicago 5, Ill.*

Enter 116 on Reader Card

Air compressor

A THREE-STAGE air compressor has now been developed. It was recently placed in loan service in the oil industry for evaluation in supplying deeper hole drilling air. The machine is designed to furnish an automatically controlled, constant force of 250 psig. with momentary pressures up to 300 psig. This level extends well into deep drilling requirements, but still maintains the important space and maintenance advantages of the rotary compressor. *Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.*

Enter 117 on Reader Card

Multi-purpose transport body

A NEW BULK TRANSPORT body for carrying cement and other free-flowing materials such as bauxite, carbon black, ammonium nitrate and fertilizers has been announced. Unique feature of the new body is its combination air-mechanical discharge system which permits the user to select either a combination of Air-Mechanical or Straight Mechanical discharge. The SST-11P Air-Mechanical discharge elevates cement up to 100 ft. high at a rate of ¾ tons per minute, and its Straight Mechanical discharge unloads materials into pit or conveyor at an approximate rate of one ton per minute. *Baughman Mfg. Co., Jerseyville, Illinois.*

Enter 118 on Reader Card

(Continued on page 184)

Typical Feedoweight installation showing hopper arrangement and control cabinet.

For Automatic Feeding, Blending and Proportioning of Bulk Materials by Weight the Merrick FEEDOWEIGHT®

This remarkable machine provides precise, uniform control of the rate of feed of bulk materials **by weight.** Used by the chemical, cement, pulp and paper, mining and other industries in blending, mixing and proportioning, the Feedoweight utilizes a powered feed regulator controlled by the scale beam to increase or diminish the flow of material. A continuous, running total of the weight of the material fed is also provided.

The Feedoweight is available in a range of models and tonnage capacities to suit any application. Write today for bulletins describing its operation and application.

Fifty years of "firsts" in automatic weighing

MERRICK SCALE MANUFACTURING CO.

180 Autumn Street • Passaic, N. J.

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T.C. WRITE FOR CATALOG 56

DURABLE ECONOMICAL WOVENWIRE SCREENS KNOWN AROUND THE WORLD

TWIN CITY IRON & WIRE CO.

35 W. WATER STREET • ST. PAUL 7, MINNESOTA

Enter 1052 on Reader Card

WHAT ARE YOU PAYING FOR REPAIRS?

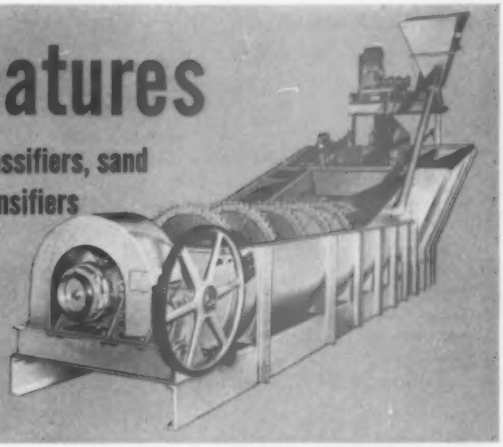
The money you are paying to keep worn-out equipment working may be just enough for you to own better equipment.

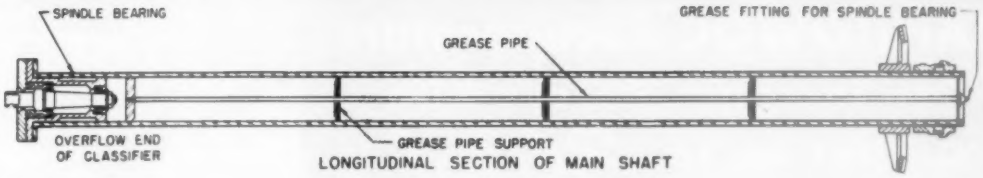
See the **"WHERE TO BUY"** *Section*

Exclusive Akins Features

which assure low-cost, trouble-free operation of classifiers, sand washing classifiers, heavy media separators and densifiers

50 years of experience in the design, manufacture, and operating performance of spiral classifiers, heavy media separators and densifiers, has proven the importance of the exclusive mechanical features of the Akins machines... importance in terms of metallurgy, and in the economy of long, trouble-free operating life with minimum maintenance.





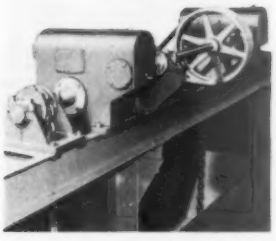
LONGITUDINAL SECTION OF MAIN SHAFT

SUBMERGED BEARING

The patented submerged bearing has proven its advantages of durability, trouble-free operation, and ease of maintenance.

LUBRICATION

The submerged bearing is grease-gun lubricated through a pipe in the main shaft; thus the pipe is isolated from tank contents and protected against breakage. Grease fitting is at upper end of shaft for maximum convenience.



MECHANICAL LIFTING MECHANISM

The lifting device consists of chains, chain sprocket sheaves, and motor-driven or hand-operated reducer unit. Experience has proven this mechanical arrangement to be the most positive, with no possibility of slippage. Minimum maintenance. No packing glands or rods to become worn.

SPIRAL PITCH

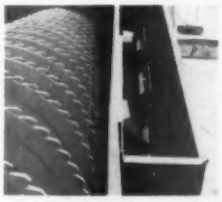
50 years of experience has shown that the half-diameter pitch gives maximum raking capacity and results in less slippage and less wear than advanced pitch spirals.

TANK SUPPORTS

Web beam substructure supports tank. There's no load to be carried by tank. This also reduces installation cost by eliminating need for extra sub-structures to support tank.

WEARING SHOES

Wearing shoes are made of various alloys, including Climax 42-A. Patented serrated wearing shoes are available for special applications. Special inner shoes are provided for heavy rake loads.



DRIVE

The bevel gear, V-belt drive has proven to be the most trouble-free and flexible. It permits mounting the motor, or motor-reducer, horizontally; and changing speeds quickly and inexpensively, by simply changing V-belt sheave ratio.

OVERFLOW BOX

An overflow box, with a pipe connection, is furnished as standard... requires only a single connection.

For complete information on Akins machines write for catalogs.

Manufacturing Division

MINE AND SMELTER SUPPLY CO.

DENVER 16	NEW YORK 17	SALT LAKE CITY 1	EL PASO
3800 RACE STREET	122 E. 42nd STREET	121 W. 2nd S.	1515 11TH AVE.

Licensed Manufacturers and Sales Agents in Canada, Australia, Sweden, England, South Africa
Sales Agents in Peru, Chile, Philippine Islands, Japan, New York City (for Continental Europe) and in principal cities of the United States.

Enter 1108 on Reader Card

NEW MACHINERY

(Continued from page 182)

Lube system

A COMPLETE, PACKAGED lubricating unit with built-in safety features is now being manufactured. The new "Protecto-Lube" system was designed primarily for Symons Cone Crushers. It is now available with new units for crushing and processing equipment now in use and can be adapted to many other types of mechanical equipment. Lubricant is under constant, controllable pressure and temperature and is filtered in the oil circulating system.

Built in three sizes, the units are available for 10, 25, and 50 gpm. output, with an available operating range of 20 percent above and below this figure, based on 500 SSU. lubricating oil at 100 deg. F. and 50 psi. pump outlet pressure.

The temperature of return oil from the lubricated machine is automatically controlled. When temperatures exceed the safe range, a control light goes out and a warning horn sounds. Further warning protection is provided by the Symons "Protecto-Lube" system against possible line breakage or excessive leakage. *Nordberg Mfg. Co., Milwaukee, Wis.*

Enter 119 on Reader Card

Dust sampler

A NEW DUST SAMPLER designed to measure dust particles discharged from dust control equipment has been announced. This equipment has been used by the manufacturer for many years to determine dust conditions in plant dust control systems. It is now available to producers who wish to conduct their own dust control measurements.

The Iso-Kinetic Dust Sampler will accurately measure grains of dust passing through dust control ducts. It will measure particles being discharged from cyclones and other dust control equipment which exhaust to the atmosphere. Complete dust sampler assembly consists of a rotometer, air-line filter, air pump, oil reservoir, oil trap, electric motor, instructions and charts. *The Day Co., 810 Third Ave., Minneapolis 13, Minn.*

Enter 120 on Reader Card

Open-gear grease

No. 29 IS A special high-tenacity grease developed for use on open gears subject to strenuous service. According to the manufacturer, it provides a highly adhesive lubricating film that reduces wear, increases gear life and lowers power consumption. It retains its adhesiveness even under severe dust conditions. Having a wide operating temperature range, it can be applied without heating in cold weather and will not melt, drip or dry out at high temperatures.

The lubricant is also unaffected by high pressures. It stands up under heavy loads, resists squeezing out and prevents metal-to-metal contact. In addition, it resists acids and alkalies and repells water. It is supplied in cartridged form. *Keystone Lubricating Co., 3100 N. 21st St., Philadelphia 32, Pa.*

Enter 121 on Reader Card

(Continued on page 187)

MANITOWOC Recuperators
Can Increase Rotary Kiln Output Up to 30%!

Manitowoc Type S Recuperator mounted on unit-fired kiln 11' x 400'.

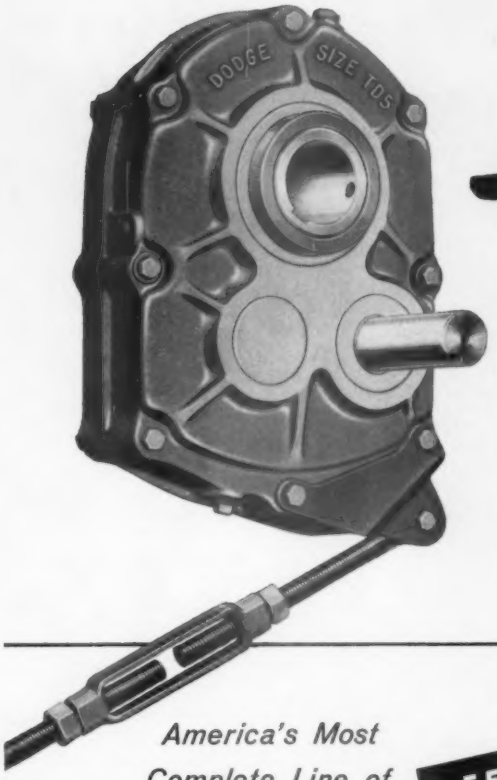
★ *Rapid air quenching and cooling*
★ *Instantaneous ignition of air-fuel mixture*
★ *Increased production*
★ *Highest heat exchange efficiency*
★ *Greatly improved grindability*
★ *Substantial fuel savings*

Here's why Manitowoc Recuperators have improved rotary cement kiln performance in numerous world-wide installations:
1. The active cooling surface is engineered into the smallest possible area, allowing the cooling air to contact the clinker before it has begun to chill. 2. Pre-heated air travels the shortest possible distance, reducing heat loss. 3. Heat loss through radiation is almost eliminated. 4. Pre-heated secondary air volume contacts the primary air-fuel mixture in a highly turbulent condition, assuring instant ignition.

See how Manitowoc Recuperators will increase your kiln output. Write today for this informative catalog.

MANITOWOC SHIPBUILDING, INC., *Manitowoc, Wis.*
(A subsidiary of The Manitowoc Company, Inc.)

Enter 1053 on Reader Card



Torque-Arm

THE DODGE DEVELOPMENT THAT CHANGED THE NATION'S HABITS OF SPEED REDUCTION

America's Most Complete Line of Shaft Mounted Speed Reducers

55 MODELS

- Capacities up to 170 hp
- Output speeds from 10 to 378 rpm!
- Single Reduction
- Double Reduction
- 5 to 1 Ratio
- 15 to 1 Ratio
- 25 to 1 Ratio
- Any speed ratio up to 150 to 1 obtainable by selection of pre-determined combination of reducer and V-belt drive.

CALL THE TRANSMISSIONEER — your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look in the *white* pages of your telephone directory for "Dodge Transmissioneer."

In fewer than ten years, the range of Torque-Arm Shaft Mounted Speed Reducers has increased from 6 to 55 models, to meet the ever increasing demand for this improved method of speed reduction.

By eliminating foundation, sliding base and flexible coupling this modern speed reducer has saved untold installation time and untold dollars of cost.

The rugged semisteel housing developed by Dodge has never been improved upon. It is corrosion resistant—and it has the strength to hold bearing seats in line for the life of the unit.

Dodge design provides wide spacing for the bearings. Loads are carried easily, contributing to Torque-Arm's long life and very high efficiency. The gears are finest quality—helical, heat treated steel.

Torque-Arm mounts vertically or horizontally in any position around the driven shaft. It locks to the shaft on *both* sides of the housing. The holes in the output hub provide simple removal with puller. Overload release and built-in backstop are optional.

Dodge Torque-Arm is America's most widely used shaft mounted speed reducer. It is stocked by your local Dodge Distributor. Ask him. Or write us for bulletin.

DODGE MANUFACTURING CORPORATION, 2600 Union, Mishawaka, Ind.

DODGE
of Mishawaka, Ind.

Enter 1109 on Reader Card

Six Marions Work Here

This 93-M 2½ yard shovel is one of six Marions which keep the rock rolling at a Pennsylvania cement plant.

Another 93-M, three Marion electric shovels built nearly 35 years ago and a Marion 362 diesel dropball complete the Marion equipment team at this busy operation producing in excess of a million tons a year.

The reasons why Marion is preferred equipment in many quarries, large and small, in many parts of the world deserve your investigation. Get the facts on today's Marion quarry machines - - today. Modern Marion electric quarry machines are available in sizes from 2½ to 10 yards.

CONSULT MARION MINING SPECIALISTS

for lowest costs on your property!

MARION POWER SHOVEL COMPANY - MARION, OHIO, U.S.A.

A Division of Universal Marion Corporation

NEW MACHINERY

(Continued from page 184)

Swing-hammer pulverizer

LOW POWER CONSUMPTION is an advantage of the new Cyclo pulverizer which crushes almost entirely by impact. Economy of operation and first cost, as well as small size, make these pulverizers ideal for crushing materials between 10 and 40-mesh size.

Swing-hammer Cyclo pulverizers are used for reducing limestone, gypsum, slate, shale, cinders, and similar crystalline and friable materials. High-speed rotation of the hammers pounds incoming solids against a series of hardened breaker blocks. The majority of the crushing is accomplished by this action. Material reduced to proper mesh is discharged through a bottom screen and oversize material is swept up by the hammers and further reduced against the breaker blocks. Housings are welded steel, combining ruggedness, light weight, and economy. The three machine sizes available have capacities from 1 to 10 tons per hour with power requirements from 5 to 20 hp. *The C. O. Bartlett & Snow Co., 6200 Harvard Ave., Cleveland 5, Ohio.*

Enter 122 on Reader Card

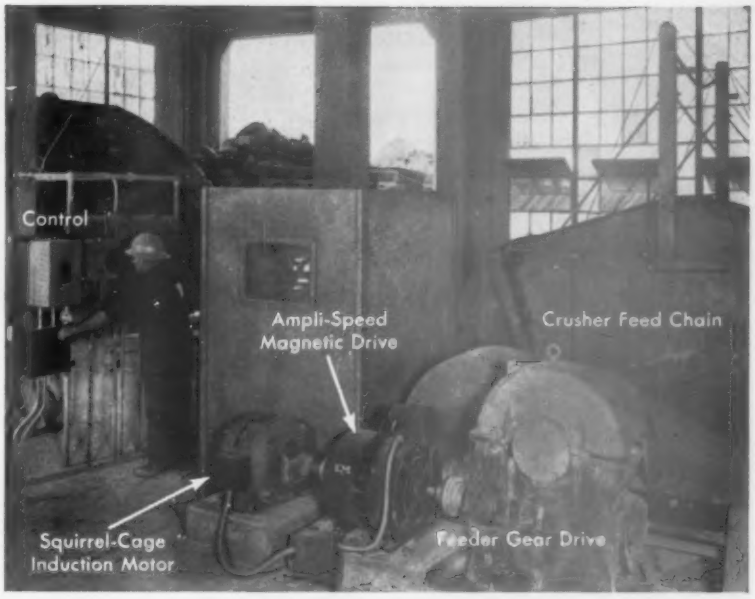
Hard-facing electrode

A HIGH-ALLOY, HARD-FACING electrode with high resistance to extreme abrasion, medium impact and high compressive loads is now available. This hard-facing rod has proved to be highly successful on all types of earth-working equipment, shovel buckets and teeth, crushers and other parts subject to severe destructive wear. Field experience indicates that this electrode may be expected to provide service life surpassed only by tungsten carbides.

This tubular electrode with a dipped graphitic coating, known as Stoody 2134, contains approximately 43 percent alloy materials. Deposits bond readily to carbon, low-alloy and manganese steels. They are magnetic, non-machinable, non-forgeable and will not respond to heat treatment. The new rod has excellent arc characteristics on ac. and dc., straight or reverse polarity. Weldability and build-up are superior. Hardness ranges from 56 to 60 Rockwell C with a two-pass deposit on medium carbon steel. Water quenching from 1750 deg. F. increases hardness to 63-65 Rockwell C. Deposits will not work-harden. *Stoody Co., Whittier, Calif.*

Enter 123 on Reader Card

(Continued on page 189)



CEMENT COMPANY STEPS UP CRUSHER OUTPUT 10%

Stops overloading by automating feeders with E-M AMPLI-SPEEDS

PROBLEM: "How to keep hammermill crushers fully loaded without overloading?" That was the problem facing operators of a large midwest cement plant.

Crushers were severely overloaded when heavy concentrations of rock were loaded onto the traveling feed chains a carload at a time. And to make matters worse, the steadily moving feeders kept right on feeding the already overloaded crushers. Yet, *in between* carloads the crushers were underloaded because the wound-rotor motors driving the feed chains were kept at their lowest speed to minimize overloading.

SOLUTION: Mill engineers replaced the wound-rotor motors with 20 hp, 1750 rpm squirrel cage induction motors they had in stock and installed E-M Ampli-Speed Magnetic Drives between the motors and the feeder gear drives. Simple control circuits were devised by putting a current transformer in each crusher motor power circuit and feeding its output through a rectifier to the Ampli-Speed Control.

RESULT: Now when crushers start to overload, motor line current signals the Ampli-Speed to stop the feeder. When the threatened overload passes, crusher motor line current drops and the feeder moves forward. This automatic start-stop action of the E-M Ampli-Speeds keeps the crushers fully loaded but never overloaded. Time saved between carloads by the increased speed of the feed chains has stepped up output 10%.

Do you have a speed control problem? . . . Ask your nearby E-M speed control expert for help. He will be glad to give you details about precise, adjustable control with Ampli-Speed. Also, write the factory today for Bulletin No. 1140-RP.

Somewhere in your plant an operation can be improved with smooth, adjustable speed control . . .

DO IT YOURSELF WITH AMPLI-SPEED

E-M

44J3-1PA-2211

ELECTRIC MACHINERY MFG. COMPANY

Minneapolis 13, Minnesota

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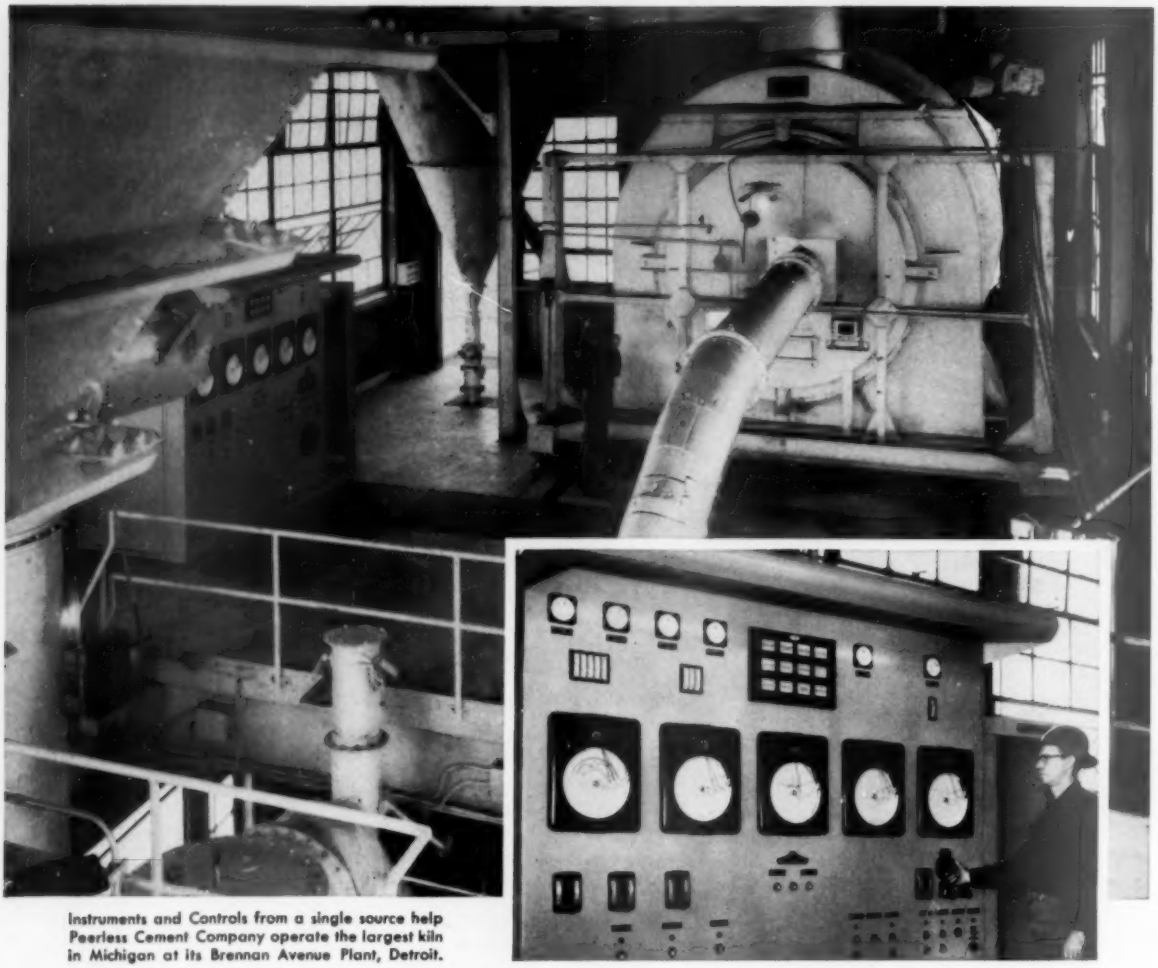
Enter 1055 on Reader Card



Instruments and Controls from a single source help Peerless Cement Company operate the largest kiln in Michigan at its Brennan Avenue Plant, Detroit.

This giant kiln gives peak performance <u>longer</u> with Bailey Controls

The Peerless Cement Company of Detroit demands maximum capacity, uniform production and low fuel rate from its largest kiln . . . and Peerless gets it!

They do it with a Bailey Control System that gives them complete control of combustion, clinker cooler, and other kiln variables.

The system keeps continuous chart records of 11 important variables, including temperatures, drafts, air flow, kiln speed, fan speed, % oxygen, and % combustibles.

All this is done so dependably that the kiln often makes week-long runs without being touched.

All recording receivers in the Bailey System are plug-in components—easily removed, regrouped, or replaced to meet changing requirements. Additional records are added simply by plugging in receivers on existing recorder cases. Your Bailey Engineer can help you plan for peak performance — call him or write for your Bailey Kiln Control Folder.

C115-1

BAILEY METER COMPANY

1039 IVANHOE ROAD • CLEVELAND 10, OHIO

In Canada—Bailey Meter Company Limited, Montreal

BAILEY METERS

Enter 1110 on Reader Card

NEW MACHINERY

(Continued from page 187)

Dust-collector cleaning

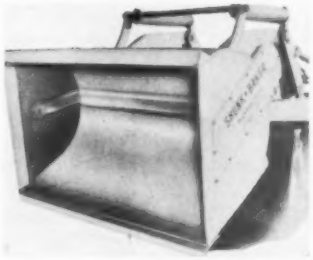
THREE ALTERNATE METHODS for bag cleaning are now available with one glass-bag dust collector system. 1) The Sonoclean unit (not ultrasonic) generates low-frequency vibrations which cause the bag to quiver slightly, dislodging dust collected on the inner bag surface.

2) Reverse air flow cleaning relies on a relaxing action or collapse of the bags to remove the collected dust. This is done by shutting off the main collector fan; then a small fan is turned on to give a reverse air flow. No shaking is required and wear is said to be minimized. 3) The third alternate cleaning method is Swing-Clean, a unit which imparts a gentle downward wave motion to the bag. This removes accumulated dust but doesn't fracture the glass cloth.

The first large-scale installation of glass bags for dust collecting was made in a Canadian smelting plant over a year ago. Made by the developer of the three cleaning systems, the set-up is said to have 99-plus percent efficiency. Two Lehigh Valley cement producers are now installing the glass bag collectors. *Dracco Div., Fuller Co., 4063 E. 116th St., Cleveland 5, Ohio.*

Enter 124 on Reader Card

Self-cleaning bucket



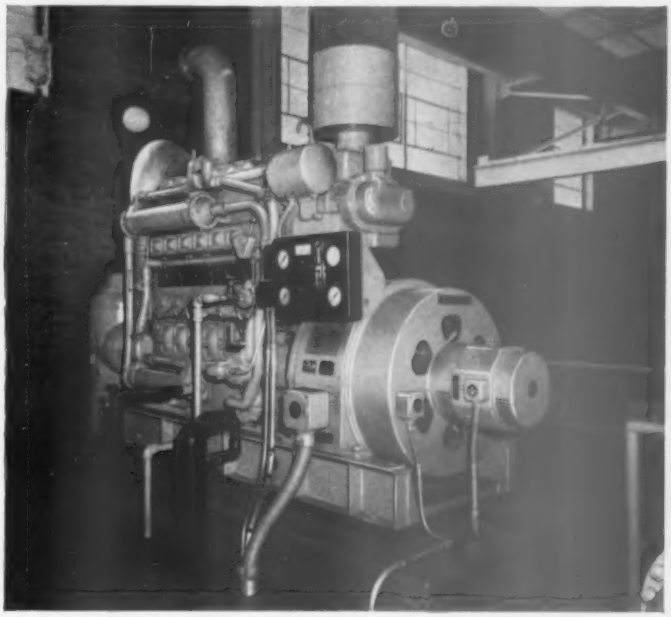
A NEW SELF-CLEANING front loader bucket that works on the simple but effective principle of the ice cream scoop has been introduced. Called the Shunk-Baker self-cleaning bucket, the attachment is furnished in 1, 1½, 2 and 2¼ cu. yd. capacities and is interchangeable with rear-hinge buckets on wheel or crawler front-end loaders. It is designed to increase yardage in gumbo, muck, kaolin, sticky clay and other heavy wet material. It eliminates dumping half-loads or stopping to clean the bucket by hand. *Shunk Mfg. Co., Bucyrus, Ohio.*

Enter 125 on Reader Card

(Continued on page 190)

Picture of O-P economy!

Ohio pumping station saves $300 a month using F-M Opposed-Piston standby diesel for both power generation and pumping



Compact, lightweight Model 38F5¼ O-P is rated 450 hp. at 1200 rpm., direct drives a 175-kw. F-M alternator and, through right-angle gears, an F-M Pomona Vertical Turbine Pump with 5.5 mgd. capacity at discharge pressure of 105 psi.

Electric power off the flywheel end, high-service pumping off the front—that's the standby job cut out for this Model 38F5¼ Fairbanks-Morse O-P Diesel in the Elyria, Ohio water works serving 60,000 people.

Called into service for 3 to 6 hours a day in the Spring of 1958, the O-P pumped water for $1.50 less per million gallons than purchased power—a $300 per month reduction, including savings on demand charges. Each Saturday the engine makes a test run as the sole high-service on the line.

Versatile as well as economical, the Model 38F5¼ O-P is also ideal for direct-driving other equipment off the rear, with front end of shaft driving an auxiliary generator, crusher, pump, etc. The O-P can be furnished for either diesel, dual-fuel, or spark-ignited operation, and is available as a complete packaged unit with all accessories attached to the frame. Write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

FAIRBANKS-MORSE

a name worth remembering when you want the BEST

DIESEL, DUAL FUEL AND GAS ENGINES • LOCOMOTIVES • ELECTRIC MOTORS • GENERATORS
PUMPS • SCALES • COMPRESSORS • MAGNETOS • HOME WATER SYSTEMS

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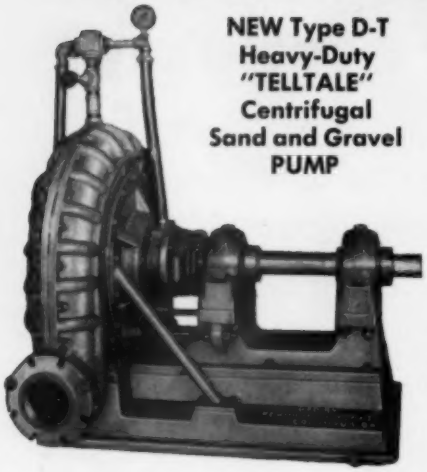
A PUMP UNCHOKES ITSELF AND KEEPS ON ROLLIN' ALONG



NEW Type D-T Heavy-Duty "TELLTALE" Centrifugal Sand and Gravel PUMP

"Another thing hard to believe is that whenever a plug blocks the line we are able to put on a few more RPMs and raise the pressure enough to blow it on through—which would happen with no other pump I ever owned."

So says Wilson Brisbois, American Stone Products, 6335 Sashabaw Road, Clarkston, Mich., reporting 175 to 200 cubic yards of sand and gravel per hour produced by his 8 x 10" Type D-T Heavy Duty "Telltale" Pump.

AS LOW IN DOWNTIME AS IT IS HIGH IN PRODUCTION

The useful and exclusive telltale feature is one of all the best retained in the latest "Telltale" pump, only type we now manufacture.

Some new features: New highs in production—new lows in downtime, because of simple foolproof assembly for changing parts—also "Telltale's" own.

Available with either tough semi-steel or best-in-the-long-run Ni-Hard wearing parts in 4", 6", 8", 6 x 8" suction and 8 x 10" suction. Now available also in either alloy, 45 and 90° extra-heavy long-radius flanged elbows. Write for Type D-T Heavy-Duty folder and prices.

PEKOR IRON WORKS, INC.

ESTABLISHED 1892

LOCK DRAWER 909 FAIRFAX 2-4020 COLUMBUS, GEORGIA

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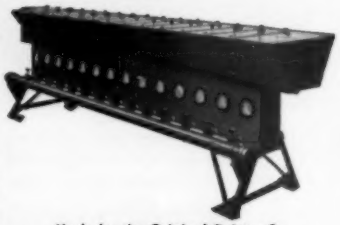
For Classifying Sand Grains

Even dirty sand is cleaned and classified most efficiently with the CONCENCO® CPC Classifier. Working from hydraulic water pressure only, with no moving parts, it sorts grains accurately and sharply into as many sizes as you wish—one size for each cell in the classifier. Dirt and fine contaminants are discarded as a slime overflow. Send for full information.



Made by the Original Deister Co. *Incorporated 1906*

The DEISTER CONCENTRATOR COMPANY, INC.

915 Glasgow Avenue Fort Wayne, Indiana

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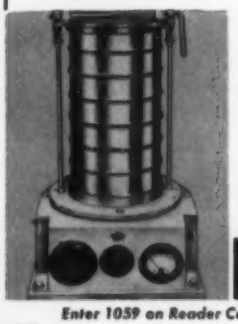
The NEW double action *SYNTRON*

Vibrating

TEST SIEVE SHAKERS

produce uniform, dependable analyses, faster



SYNTRON'S New Electromagnetic Test Sieve Shakers provide a double action—both vertical and rotating—for faster, more accurate analysis. They are easy to operate and the absence of mechanical wearing parts assures dependability and low maintenance.

SYNTRON TEST SIEVE SHAKERS FEATURE:

- Double action electromagnetic drive—3600 controllable vibrations per minute.
- Rheostat voltage control
- Reset timer for accurate time testing

Each SYNTRON Test Sieve Shaker will accommodate up to 8 standard 8 inch test sieves and bottom pan.

Operation from 115 volt, 60 cycle a-c (230 volt to order).

Write for free illustrated brochure

SYNTRON COMPANY

450 Lexington Avenue Homer City, Penna.

Enter 1059 on Reader Card

NEW MACHINERY

(Continued from page 189)

Low-cost bearings

THREE-BOLT and two-bolt flange bearing units are now available in a precision, low-cost line of ball bearing units. A cartridge unit with spherical od. is permanently mounted in a one-piece malleable housing which provides maximum strength with light weight. Design of the housing permits either flush or recessed mountings for maximum application flexibility and desired shaft extension with minimum overhang.

Precision self-alignment takes place automatically between the spherical od. of the bearing and the spherical id. of the housing. Centrifugal-labyrinth seals retain the lubricant and prevent the entry of dirt. Effective and simple race to shaft lock is provided by two cup point set screws. The new units are available in standard sizes: ¾ to $1\frac{7}{16}$ in. *Sealmaster Bearing Div., Stephens-Adamson Mfg. Co., Ridgeway Ave., Aurora, Ill.*

Enter 126 on Reader Card

Longer life for cleaning stars and grinding balls

"ABMET," an abrasive-resistant cast metal is now available in grinding balls as well as special applications for abrasive-material handling equipment. Grinding balls are available in sizes ranging from ¾-in. through 1¼-in. which can be used for grinding or pulverizing cement, metallic ores, minerals and sand. *Quincy Foundry, Inc., Quincy, Ohio.*

Enter 127 on Reader Card

Revolutionary lift truck control

A NEW CONCEPT in lift truck control and performance has been introduced to the material handling industry. In the Monotrol system, throttle and forward-reverse direction control are combined in one right-foot pedal to free the lift truck operator's hands for full-time steering and load handling control. Dashboard push-buttons for "park" and "drive" govern an automatic parking brake and engagement of the automatic transmission.

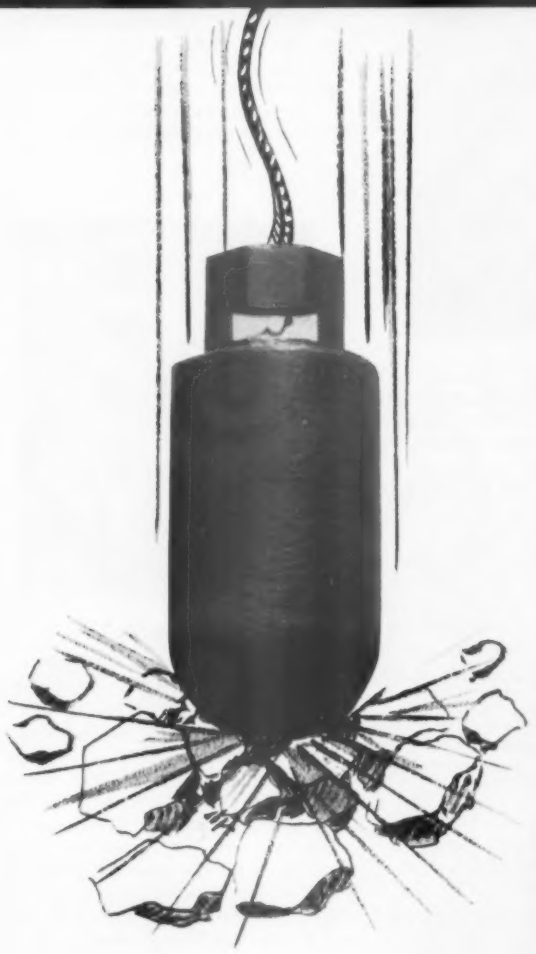
Other features of the system include a safety starting switch, which permits engine starting only if the "park" button is down, and a left-foot inching-brake pedal. Monotrol is available on the manufacturer's line of SpaceSaver 30, 40 and 50 lift trucks. *Hyster Company, 1003 Myers St., Danville, Ill.*

Enter 128 on Reader Card

CAPE AN ALLOY DROP BALL

THE *NEW* FORGED STEEL DROP BALL THAT OUTWEARS THEM ALL!

NOW, "Cape Ann" offers a SUPER DUTY DROP BALL FORGED (not a casting) from "Cape ANALLOY", a tough abrasive resisting Alloy Steel, for quarries requiring extra hard usage from a drop ball. Field tested in the rugged granite quarries of New England with outstanding results. "Cape Ann" will continue to offer its regular line of Forged Steel Drop Balls that have proved successful in the field for many years to quarries that do not require a super duty type. All "Cape Ann" Drop Balls are SONIC TESTED before shipment. Fully guaranteed against breakage.



FORGED AND HEAT TREATED DROP BALLS from 2,000 to 12,000 lbs.

Your secondary breakage problems will be economically solved when you start using "Cape ANALLOY" Forged Steel Drop Balls. The specialized engineering services and field experience that go into the "Cape Ann" FORGED STEEL DROP BALLS will give you savings away beyond your expectations.

WRITE FOR INFORMATION

CAPE ANN ANCHOR & FORGE CO.

P. O. BOX 361

GLOUCESTER, MASSACHUSETTS

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MANUFACTURERS NEWS

Worthen sales manager

GENERAL ELECTRIC, Communication Products Dept., Lynchburg, Va., has appointed Kent J. Worthen (photo) national sales manager for G-E two-way radio. Mr. Worthen joined GE in 1949 after receiving an electrical engineering degree at the University of Utah.

Also at GE, L. R. Sheeley, formerly manager of mobile radio equipment sales, has been named national sales manager for the Computer Dept., in Phoenix, Arizona.

Seminar on air pollution

RESEARCH-COTTRELL, INC., Bound Brook, N.J., sponsored a seminar on air pollution control and industrial gas cleaning back in April. The purpose of the conference was to discuss from the Research-Cottrell viewpoint what the industrial gas cleaning equipment manufacturer can do and is doing to help industry generally to achieve better air pollution control and to recover valuable metals and reusable gases from industrial wastes.

Sales managers

THE SCIENTIFIC and Process Instruments Division of Beckman Instruments, Inc., Fullerton, Calif., has announced the appointments of George A. Green, sales manager, eastern region, with headquarters in Mountainside, N.J.; Roy F. Brown, sales manager for process instruments; Jack A. Challacombe, sales manager, midwestern region, with headquarters in Chicago.

Knight elected president

ALFRED W. KNIGHT was elected president of the Western Precipitation Corp., Los Angeles, Calif., succeeding Walter A. Schmidt, who remains as chairman of the board.

Mr. Knight joined the company in 1924 and in 1938 was elected vice president and in 1956 became executive vice president-general manager.

Mr. Schmidt leaves a post which he has held continuously since 1911. He joined the Western Precipitation Corp. shortly after it was incorporated in 1907 and has directed its operation for 48 years.

Also at the meeting William C. Volkel was named assistant secretary and all other officers were re-elected.

Clark appoints Ellis

CHARLES L. ELLIS has been appointed chief field engineer of the Construction Machinery Division of Clark Equipment Co., Benton Harbor, Mich. Mr. Ellis will direct all field engineering activities in connection with "Michigan" construction machinery.

Ryerson building new general office building

JOSEPH T. RYERSON & SON, INC., Chicago, Ill., has announced the construction of a new general office building in Chicago. Located adjacent to its plant at 16th and Rockwell Sts., it will be 210 ft. x 210 ft., two stories, of steel frame construction with walls largely of glass and stainless steel. The building was designed by Skidmore, Owings & Merrill. General contractor is Sumner Sollitt Co. Completion is scheduled for late 1960.

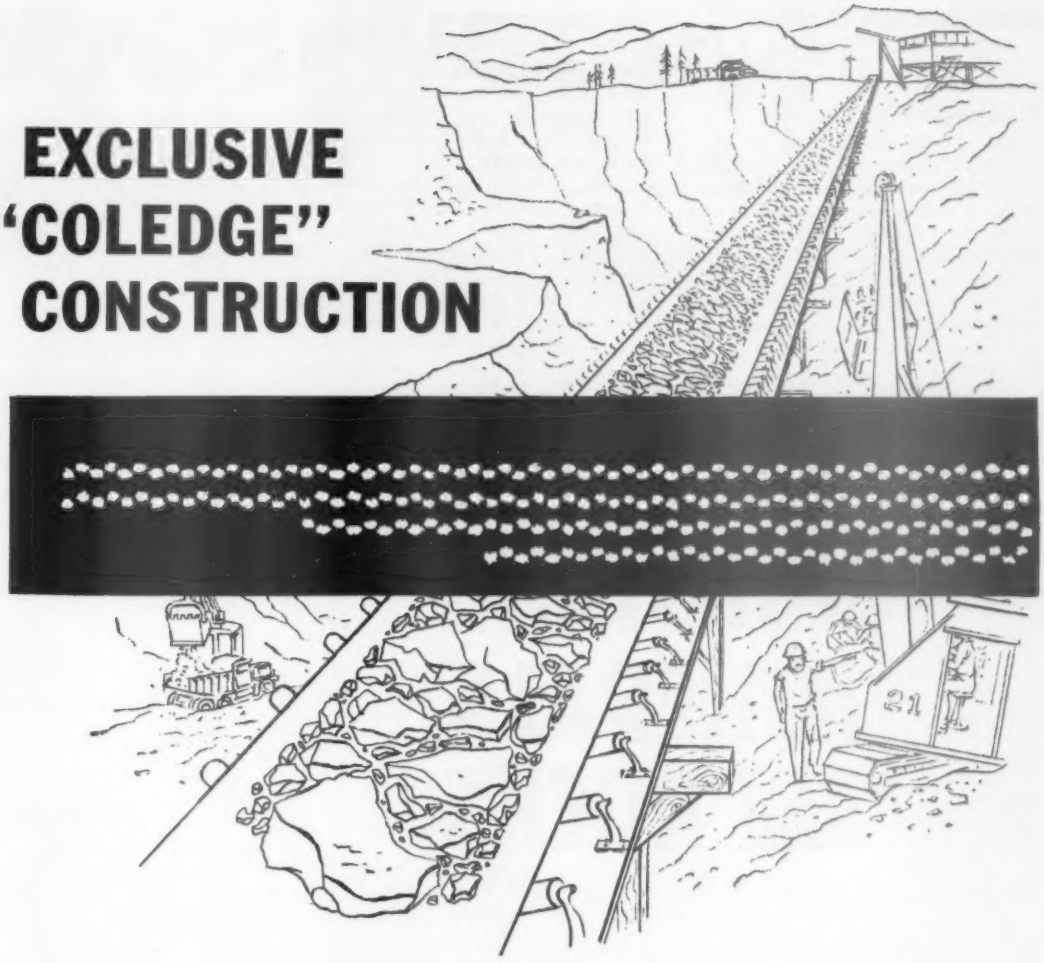
M. B. Garber retires

M. B. GARBER, vice president of The Thew Shovel Co., Lorain, Ohio, retired April 1 after 32 years with the power shovel and crane manufacturing company.

Active in many industry associations, Mr. Garber has been chairman of the manufacturers division of the National Crushed Stone Association, chairman of the manufacturers division of the National Sand and Gravel Association and president of the Power Crane and Shovel Association.

(Continued on page 194)

EXCLUSIVE "COLEDGE" CONSTRUCTION



Quaker Thermoid gives Conveyor Belting extra life where it counts

Punishment at the edges—especially the tough use dealt out in quarrying—can kill most conveyor belting in a fraction of the time that Thermoid-Quaker Conveyor Belting lasts. The unique "COLEDGE", though, available on all grades of Thermoid-Quaker Conveyor Belting, puts more rubber where it's needed, makes a more flexible and wear-resistant edge where the abrasion is greatest. Tests show Thermoid-Quaker Belting with "COLEDGE" construction lasts and lasts on the same jobs where other belting fails.

What's more, all Thermoid-Quaker Conveyor Belting is *prestressed* in manufacture, so that the belt is actually in compression when you get it—ready for the heaviest load without strain.

Examine Thermoid-Quaker Conveyor Belting with the exclusive "COLEDGE" construction at your Thermoid distributor's, or write for further information to *Thermoid Division, H. K. Porter Company, Inc., Tacony & Comly Sts., Philadelphia 24, Pa.*

THERMOID DIVISION PORTER H.K. PORTER COMPANY, INC.

PORTER SERVES INDUSTRY: with Rubber and Friction Products—THERMOID DIVISION; Electrical Equipment—DELTA-STAR ELECTRIC DIVISION, NATIONAL ELECTRIC DIVISION; Copper and Alloys—RIVERSIDE-ALLOY METAL DIVISION; Refractories—REFRACTORIES DIVISION; Electric Furnace Steel—CONNORS STEEL DIVISION, VULCAN-KIDD STEEL DIVISION; Fabricated Products—DISSTON DIVISION, FORGE AND FITTINGS DIVISION, LESCHEN WIRE ROPE DIVISION, MOULDINGS DIVISION, H. K. PORTER COMPANY DE MEXICO, S. A.; and in Canada, Refractories, "Disston" Tools, "Federal" Wires and Cables, "Nepcoduct" Systems—H. K. PORTER COMPANY (CANADA) LTD.

Enter 1083 on Reader Card

MANUFACTURERS NEWS

(Continued from page 192)

New engineering service

THE LO-VEYOR DIVISION of Ajax Flexible Coupling Co., Inc., Westfield, N.Y., has announced the establishment of a new vibration engineering service as an aid to manufacturers in handling and processing bulk materials and products. The service is based on broad experience gained in the performance of Ajax Lo-Veyors in a wide range of industries over a period of 24 years.

Sly representatives

TWO NEW FIRMS have been appointed by W. W. Sly Mfg. Co., Cleveland, Ohio, as representatives, sales and service for dust control systems, industrial ovens, blast cleaning equipment and tumbling mills.

The Sinclair-Brandt Equipment & Supply Co., 6620 Dixie Drive, Houston, Texas, headed by J. A. Sinclair and John L. Brandt permits expanded sales and service in the Texas area.

The Devlin Brothers, 1003 Maritime Bldg., New Orleans, are Louisiana representatives. Thomas J. Devlin and John J. Devlin head the firm.

No Other Book Like It!

"INDUSTRIAL MINERALS and ROCKS"

3rd Edition — Completely Revised

Here is the standard reference book on nonmetallic mineral occurrence, mining, preparation for market, uses, and vital statistics. Its significance to engineers and executives makes it a must in the reference library of every firm in the minerals industry.

This unique volume has 55 chapters . . . covering the widest possible range of industrial minerals and rocks, from abrasives to zircon.

Dr. Joseph L. Gillson, recognized authority on industrial minerals, President-elect of AIME, is editor-in-chief . . . aided expertly by an editorial board of leaders in each field.

This brand-new edition has been completely rewritten. So much new material has been added that the format has been enlarged. All maps, drawings and pictures are new.

The publication price of this important source book is $12. Copies will be available in September. Mail the coupon below *now*, to secure a copy as soon as possible. (Extra postage to addresses outside the United States, 50¢ per copy.)

American Institute of Mining, Metallurgical and Petroleum Engineers
29 West 39th Street, New York 18, New York

Please send me _____ copy (copies) of "Industrial Minerals and Rocks." • Payment in the amount of $_____ is enclosed

Name _____

Street _____

City _____ State _____

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Ohio Locomotive delivers first of its 50th anniversary cranes

OHIO LOCOMOTIVE CRANE CO., Bucyrus, Ohio, pioneer manufacturer of locomotive cranes, observed the opening of its 50th year by delivering a 30-ton diesel powered crane to Mansfield Steel and Supply Co., Mansfield, Ohio.

The half-century just finished witnessed the transition from steam through gasoline, to diesel powered engines. Ohio Locomotive has figured prominently in industry since April, 1909, when the organization was founded by Charles F. Michael. Walter J. Michael, son of Charles, has been president since 1938.

Purchase nuclear reactor engineering office

PURCHASE OF THE commercial nuclear reactor engineering office, Washington, D.C. of Nuclear Products-Erco Division of ACF Industries, by Allis-Chalmers Mfg. Co., Milwaukee, Wis., has been announced. Allis-Chalmers will take over ACF's commercial reactor organization together with its contractual obligations for the design and construction of power, test and research reactors. They presently include the power reactor of Elk River, Minn., and test and research reactors at Wright-Patterson Air Force Base and in Sweden and the Netherlands.

Stevenson named representative

INTERNATIONAL HARVESTER CO., Farm Equipment Sales Dept., Chicago, Ill., has announced the appointment of M. O. Stevenson as central region tractor representative. Mr. Stevenson succeeds H. K. Arp, formerly Eastern region tractor representative, who has been appointed product sales representative on the Farm Equipment Tractor Development Committee, Farmall Works tractors. *(Continued on page 196)*

"WONDERWALL™ saves us $7.80 per 1000 bags"

Robert C. Hector, President of Hector Supply Co., holds a cost-saving Wonderwall.

Hector Supply Company of Miami, Fla., operating four plants, produces and distributes fertilizers, feeds, insecticides and plant foods.

President Robert C. Hector found that West Virginia's WONDERWALL measurably reduced his company's bag costs, yet gives better service.

"We were packing 100 pounds of fertilizer in a sewn open-mouth multiwall of natural kraft. This was constructed of 1/90 AL, 2/40, and 1/50 for a total basis weight of 220#," Mr. Hector said.

"When we switched to a WONDERWALL of 1/110 AL and 1/70 construction, we saved 40 pounds in paper basis weight, and that figures out to $7.80 per thousand bags. Equally important, our bag breakage now is negligible".

WONDERWALL bags are better because they're made with Kraftsman Clupak* paper, the tough, impact-resisting kraft with the built-in stretch—pioneered by West Virginia.

Packers of cement, feed, fertilizers, sugar, flour, and many other products are reducing bag costs substantially with WONDERWALL.

See how you can save money; we'll be glad to show you. Just write Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Avenue, New York 17, N. Y.

**Clupak, Inc.'s trademark for extensible paper, manufactured under its authority.*

West Virginia Pulp and Paper

Enter 1095 on Reader Card

MANUFACTURERS NEWS

(Continued from page 194)

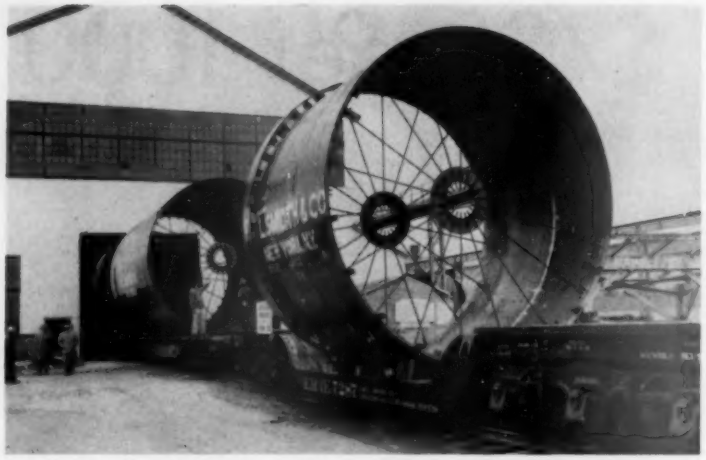
Bucyrus-Erie shows profit

BUCYRUS-ERIE CO., South Milwaukee, Wis., has announced first quarter earnings of $95,939 compared to a loss of $653,926 for the first quarter of last year. Shipments amounted to $14,537,668, 30 percent greater than for the same period in 1958.

The company also stated that machine bookings were $18,212,590 for the first quarter compared to $6,860,411 for the comparable period in 1958. At March 31, unfilled orders for machines amounted to $11,052,000.

Neikirk is general manager

CHARLES W. NEIKIRK has been named general manager of Basic Construction Materials Div. of Davon, Inc., Columbus, Ohio. He has been with the maker of sand and gravel, ready mixed concrete and concrete products for three years. Previously he served with Blue Rock, Inc., Washington Court House, Ohio. Mr. Neikirk is a graduate of Randolph-Macon College, Ashland, Va.



Transport largest rotary kiln in North America

A HEAVILY LOADED special freight train equipped with 14 heavy duty flat and depressed flat cars, left Chicago Bridge & Iron Co., Greenville, Pa., with steel sections for what will be the biggest rotary kiln in North America. The train was bound for the Dundee Cement Co.

The cylindrical sections measure as much as 17 ft. 8 in. in diam. and 41 ft. in length. The largest section weighed about 67 tons and the weight of the over-all shipment was close to 685 tons. The kiln sections ranging from 1⅛ to 4 in. in shell thickness were fabricated at Greenville. **END**

RP BUYER RESEARCH SERVICE

PRODUCER PURCHASING SERVICE *FREE*

QUICK—COMPLETE SOURCE CONTACTS FOR ROCK PRODUCTS PRODUCERS on Machinery—Equipment—Supplies—Service

___Aftercoolers, Air
___Agitators
___Aggregates (special)
___Air Compressors
___Asphalt Mixing Plants
___Bagging Machines
___Bags
___Barges
___Belting, Conveyor Elevator, Power Transmission
___Belting, V-type
___Belt Repair Equipment
___Bin Level Indicators
___Bins and Batching Equipment
___Bits
___Blasting Supplies
___Bodies, Trailer
___Buckets
___Bulldozers
___Cars, Industrial
___Classifiers
___Clutches
___Coal Pulverizing Equipment
___Concentrating Tables
___Conveyors
___Crushers
___Coolers
___Cranes
___Derricks
___Dewatering Equipment Sand
___Diesel Engines
___Dragline Cableway Excavators
___Draglines
___Dredge Pumps
___Drilling Accessories
___Drills
___Dryers
___Dump Bodies
___Dust Collecting Equipment & Supplies
___Electric Motors
___Engineering Service Consulting and Designing
___Explosives & Dynamite
___Fans and Blowers
___Feeders
___Fifth Wheel Heavy Duty Special
___Flotation Equipment
___Front End Loaders
___Gasoline Engines
___Gear Reducers
___Generator Sets
___Grinding Media
___Gypsum Plant Machinery
___Hard Surfacing Materials
___Hoists
___Hoppers
___Kilns: Rotary, Shaft, Vertical
___Locomotives
___Lubricants
___Magnetic Separators
___Mills
___Pipe
___Pumps
___Scales
___Screen Cloth
___Screens
___Scrubbers: Crushed Stone, Gravel
___Shovels, Power
___Speed Reducers
___Tanks, Storage
___Tires and Tubes
___Torque Converters
___Tractor Shovels
___Tractors
___Trailer Dump Bodies
___Trucks, Bulk Cement
___Trucks, Industrial
___Trucks, Mixer Body
___Trucks, Motor
___Valves
___Vibrators
___Welding and Cutting Equipment
___Winches
___Wire Cloth
___Wire Rope

If equipment you are in market for is not listed above, write it in space below.

The principal rock product(s) manufactured by my company is/are indicated "1", "2", "3", in order of importance below.
___Crushed Stone
___Sand & Gravel
___Slag
___Cement
___Lime
___Gypsum
___Ready Mix Concrete
___Concrete Products Type_____
Other nonmetallic mineral (What?)_____
All above information is strictly confidential to be used to guide the manufacturers in supplying proper information.

Please Check Service Desired
☐ Have Salesman Call ☐ Literature only
☐ Prices ☐ By mail ☐ Urgent

NOTE: See—Where to Buy-Classified Advertising Section for used equipment and complete plant information

Name_____
Title_____
Firm_____
Street & No._____
City and State_____
Your Signature_____ Title_____

FILL IN—TEAR OUT—MAIL NOW! *BUYER RESEARCH SERVICE DEPARTMENT:* ROCK PRODUCTS 79 W. Monroe St. Chicago 3, Illinois

"when I grow up I'm going to run one of those"

When a fellow daydreams out loud to his best girl, he dreams *big*. Running a big Bucyrus-Erie electric shovel means he's really arrived!

Many a mine or quarry owner who's now "arrived" got his start years ago with Bucyrus-Erie electrics.

That's why two out of every three shovels on the great iron ranges of northern Minnesota and upper Michigan are Bucyrus-Eries. It's also why B-E machines have long been *the standard* in large quarries, in open pit mines, and on the biggest dam and construction projects all over the world. *Wherever important jobs require the best equipment* — that's where you'll see Bucyrus-Erie.

BUCYRUS ERIE®

WHERE TO BUY

Rock Products Classified Advertising

— Where to Buy —

Forms close 12th of Month Preceding Publication

Mail to: **ROCK PRODUCTS**, Where To Buy Dept., 79 West Monroe St., Chicago 3, Illinois

DATE _____

ADVERTISER _____

BY _____

ADDRESS _____

CITY, ZONE & STATE _____

Remittance Enclosed
Terms: 10 days after receipt of invoice

RATES FOR ONE INSERTION

Column Inches Used	Rate Per Column Inch
1- 3	$9.00
4- 8	8.60
9-14	8.40
15-19	8.20
20-30	7.80

Lower rates on a contract basis. Write for rate card.

ATTACHED COPY to appear in issue(s) checked

Jan. . . . . July . . . . .
Feb. . . . . Aug. . . . .
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Apr. . . . . Oct. . . . . .
May . . . . . Nov. . . . .
June . . . . . Dec. . . . . .

BLIND ADVERTISEMENTS

Box Numbers will be assigned to ads without extra charge, if the advertiser desires.

Inquiries should be sent to the Box Number c/o Rock Products, 79 W. Monroe St., Chicago 3, Ill. They are forwarded daily to the advertiser. Rock Products cannot disclose advertisers' name or answer inquiries.

$2,000,000 LIQUIDATION BRIQUETTING PLANTS

4—Ruggles-Coles Class #XA-18 double shell indirect-direct heat rotary dryers, 104" x 70' x 5/8" shell.
4—Komarek-Greaves, briquetting presses, 75 HP, 25 tons per hour.
4—Komarek-Greaves vertical Fluxers (paddle mixers), 150 HP.
4—K-G Horiz. Fluxers, 41" dia., 50 HP.
4—K-G Pug Mills, 30" dia. x 14'4".
8—Tyler Screens, 4' x 8', 4' x 6'.
2—42" wide traveling-screen cooling conveyors, total of 950'.
4—36" x 24", 24" x 18" Jeffrey hammermills, 50 HP, 25 HP.
6—Robinson Sawtooth Crushers.
2—Pa. Crusher #C-3-30 hammermills.
20—Welded Steel bins, cone bottom, from 15,000 gallon to 90,000 gallon.
4—Keeler Boilers 200 HP, 160 PSI.
8—16", & 24" trough-belt conveyors, 100', 250', 500' long.
6—36" & 48" apron feeders, 8' long.
8—Bucket elevators, 62' and 90' c-c.
6—500 KVA Transformers.

PERRY EQUIPMENT CORP.
1418 N. Sixth Street
PHILADELPHIA 22, Pa.
Phone: POplar 3-3505

HEAT & POWER CO., INC.
60 E. 42nd Street
NEW YORK 17, N. Y.
Phone: MUrray Hill 7-5280

SPECIALS

#1 Raymond Mill
6'-5"x100' & 6'x120' Kilns
Complete Lime Hydrating plant.

CRUSHERS

1—48" x 60", 42" x 40", 30" x 36", 24" x 36", 18" x 36", 15" x 30", 12" x 24" Jaw Crushers.
2—42" x 16" Allis-Chalmers Crushing Rolls, rebuilt. 36" x 16 rebuilt Sturtevant rolls.
#636 & #848 Allis-Chalmers Hydrocone Crushers.
1—6", 10", 16", 20" McCully Superior Gyratory Crushers.
No. 3 up to No. 12 Gyratory Crushers.

BALL & TUBE MILLS

5'x22', 7'x24'

DRYERS

8½'x65' & 8'x60

Have you any machinery that you want to sell?

W. P. HEINEKEN, INC.
50 Broad St., N.Y. Tel. Wh. 4-4236

LIQUIDATION

COMPLETE CEMENT PLANT
AKRON, N.Y.

2—Allis Chalmers 8' x 100' Rotary Kiln.
1—Raymond 36" Bowl Mill, 50 HP.
1—Vulcan 6' x 50' Dryer, 25 HP.
1—6' x 20' Smidth Tube Mill, 300 HP.
1—6' x 22' Allis Chalmers Tube Mill, 250 HP.
1—Williams Hammermill size 60GA, 300 HP.
1—Clyde #3 Hydrator with motor.
1—Raymond 16' Double Whizzer Separator, 75 HP.
1—Sturtevant 14' Double Whizzer Separator, 75 HP.
14—Bucket Elevators, chain mounted, steel casing, 25' to 56' c.c.
1200'—9" and 14" Screw Conveyor.
15—Bins from 6'x7'6"x12' to 17'x20'x12'.
1—Steel Building, 60' x 80' x 40' high.
1—Steel Building, 65' x 125' x 40' high.
Miscellaneous: 500 tons Structural Steel; 2500 HP motors, 3/60/440 volt from 1 to 300 HP; Speed Reducers; Steel Grating; Copper Cable.

Your Inquiries Solicited—Send for Circulars

BRILL EQUIPMENT COMPANY
2401 Third Avenue, New York 51, N.Y.
Tel: CYpress 2-5703

RELIABLE HEAVY EXCAVATION EQUIPMENT

Draglines—Shovels—Cranes—Drills—Trucks

15-W Bucyrus Erie Elec. Drag, 215', 13 yd.
9-W Bucyrus Erie Elec. Drag, 160', 11½ yd.
9-W Bucyrus Erie Diesel Drag, 200', 9 yd.
7400 Marion Diesel Drag, 175', 13 yd.
7400 Marion Elec. Drag, 175', 12 yd.
625 Page Diesel Drag, 150', 10 yd.
621-S Page Diesel Drag, 125', 7 yd.
200-W Bucyrus Erie Diesel Drag, 125', 6 yd.
5-W Bucyrus Erie Diesel Drag, 100', 6 yd.
2400 Lima Dragline, 130', 5 yd.
4500 Manitowoc Drag, 120', 5 yd.
120-B Bucyrus Erie Elec. Drag, 115', 5 yd.
111-M Marion Drag, 100', 4 yd.
1601 Lima, 4 yd., Shovel/Drag
3900, 3500 & 3000 Manitowoc Cranes
5560 Marion 26 yd. Elec. Shovel
750-B Bucyrus Erie 20 yd. Elec. Shovel
5480 Marion 18 yd. Elec. H. L. Shovel
151-M Marion 7 yd. Elec. Shovel
170-B Bucyrus Erie 6½ yd. Elec. Shovel
4161 Marion 6 yd. Elec. Shovel
2400 Lima 4½ yd. H. L. Shovel
120-B Bucyrus Erie 4 yd. Elec. Shovel
4500 Manitowoc 5 yd. H. L. Shovel
111-M Marion Standard & H. L. Shovels
3500 Manitowoc Standard & H. L. Shovels
54-B Bucyrus Erie Standard & H. L. Shovels
Large selection of smaller Shovels & Draglines available
Model T-750 Reich Truck Mounted Rotary and Down-the-Hole Drill
McCarthy & Compton Coal Auger Drills
Euclid trucks, truck cranes, dozers, scrapers, front end loaders, attachments and other misc. equipment available

FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton Nat'l Bank Bldg.
Hazleton, Pa. GLadstone 5-3658

CRUSHERS

54" x 24" Traylor type AA Smooth Roll Crusher

16" Gyratory (Allis Chalmers) Size 8-K Gates type

36" x 16" Superior (2) smooth Roll Crushers.

30" x 16" Traylor type "A" Smooth Roll Crusher

Tyroc 4 x 10 single deck screen

24" Belt Conveyor 70' c to c, Rex Stern Idlers

L. J. LAND, INC.
P. O. Box 689 Weehawken, N. J. UNion 4-1010
P. O. Box 756 Reading, Pa. FRanklin 5-8474
In N. Y. City—CAnal 6-6976

BONDED QUALITY BARGAINS

CURRENT MODELS - IMMEDIATE SHIPMENT FROM OUR FACTORY - WRITE, WIRE OR PHONE FOR FREE CATALOG AND PRICES

BONDED® TROUGHING IDLER CONVEYOR BARGAINS

CONVEYOR PRICES INCLUDE BELTING

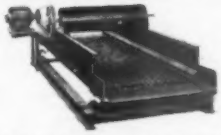
Complete Pre-Fab sections of 8" Jones & Laughlin Jr. I Beam Frame Conveyors quickly and easily joined together on the job. These beams are rolled with .20% Copper Content. Atmospheric exposure tests disclose that Junior Beams, with .20% Copper have as much as four times the resistance to corrosion as non-copper steels. Braced with structural angle, welded to frame for maximum rigidity. Equipped with 5" roll diameter idlers and return rolls, 20" diameter head pulley and 16" diameter tail pulley, mounted on 2¼" or 2⅞" diameter shaft.

We take our loss on our stock of short length belting. You can save as much as 50% on BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Belt is new 4-ply, 28 oz. duck, ⅛" top rubber cover x 1/16" bottom cover Major grade belt and is Fresh Stock made by leading manufacturers. WRITE FOR BULLETIN #1138.

Bonded troughing idler conveyors also available in Truss Frame Construction. WRITE FOR BULLETIN #1189 AND PRICES.

Belt Width	Length of Conveyor	List Price	Sale Price	Add or Deduct Per Ft.
14"	25'	$1397	$ 738	
14"	50'	2222	1159	$16.84
14"	85'	3377	1748	
16"	20'	1262	667	
16"	45'	2137	1118	
16"	60'	2662	1388	18.04
16"	90'	3712	1936	
18"	25'	1477	797	
18"	45'	2217	1182	
18"	70'	3142	1663	
18"	85'	3697	1952	19.24
18"	100'	4252	2240	
18"	130'	5362	2817	
20"	25'	1517	835	
20"	60'	2882	1548	
20"	75'	3467	1854	20.37
20"	90'	4052	2159	
24"	25'	1590	898	
24"	45'	2430	1334	
24"	70'	3480	1878	
24"	100'	4740	2532	21.78
24"	120'	5580	2967	
24"	150'	6840	3621	
30"	50'	2911	1617	
30"	70'	3871	2112	24.75
30"	90'	4831	2607	
36"	25'	1818	1118	
36"	45'	2858	1677	
36"	60'	3638	2096	27.95
36"	100'	5718	3214	

BONDED® GENERAL DUTY AND HEAVY DUTY VIBRATING



More than 7000 Mines and Quarries have modernized with Bonded Equipment

PERFECT BALANCE AND SHARP ACTION. Eccentric weight mechanism, spring mounted. 1 to 3 decks, 2' x 4' to 3' x 8'. WRITE FOR "SEVEN SECRETS OF SUCCESSFUL SCREENING" IN BULLETIN NO. 1086.

Model Number	Screening Area	No. of Decks	Sale Price
124A	2'x4'	1	$ 443
224A	2'x4'	2	472
126A	2'x6'	1	472
226A	2'x6'	2	501
134A	3'x4'	1	504
234A	3'x4'	2	570
136A	3'x6'	1	581
236A	3'x6'	2	688
336A	3'x6'	3	956
138A	3'x8'	1	675
238A	3'x8'	2	815
338A	3'x8'	3	996

FACTORY BALANCED, CONTROLLED VIBRATION. Four bearing positive throw eccentric shaft; 3' x 6' to 5' x 14'. 1 to 5 decks. WRITE FOR BULLETIN NO. 1087 AND 9 REASONS WHY BONDED IS YOUR BEST BUY.

Model Number	Screening Area	No. of Decks	Sale Price
336B	3'x6'	3	$1620
436B	3'x6'	4	1685
138B	3'x8'	1	1510
238B	3'x8'	2	1620
338B	3'x8'	3	1735
248B	4'x8'	2	2310
348B	4'x8'	3	2440
2410B	4'x10'	2	2400
3410B	4'x10'	3	2550
2412B	4'x12'	2	2590
3412B	4'x12'	3	2970
4412B	4'x12'	4	3165

BONDED® QUALITY BUILT BUCKET ELEVATORS

ENCLOSED ELEVATOR

Open or Enclosed, Vertical or Inclined Bucket Elevators with Continuous or Spaced Buckets mounted on Chain or Belting. Bonded's 19 standard models are designed for low cost, high capacity elevating of practically all bulk materials. Open and other types priced on request. There is a style of bucket for virtually every material or condition: wet or dry, lumpy or fine, granular, slivery, or pellet shapes, hot or chemically active.

Prices listed at right are for Vertical Enclosed Elevators. Standard Elevators with Chain mounted buckets use #477 or #C102B combination chain. 4, 5 and 6 ply, 32 oz. or 35 oz. duck belt is used on Belt mounted Bucket Elevators.

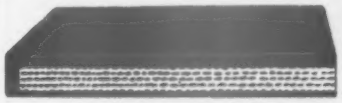
Bonded Bucket Elevators are Jig Built to insure easy Job-Site Installation.

Model No.	Bucket Size Inches	First 20' (Discharge Ht.)	Add or Deduct Per Ft.
Style "A" Spaced Malleable Buckets on Chain			
C53A	5x3½	$1071.50	$20.25
C64A	6x4	1088.50	21.00
C85A	8x5	1235.00	25.50
C106A	10x6	1281.00	27.50
C127A	12x7	1510.00	31.25
C148A	14x8	1673.50	36.00
Style "A" Spaced Malleable Buckets On Belt			
B53A	5x3½	$1099.00	$20.50
B64A	6x4	1116.50	21.25
B85A	8x5	1311.50	27.25
B106A	10x6	1692.50	33.00
B127A	12x7	1854.50	37.25
Style "E" Continuous Steel Buckets On Chain			
C85E	8x5x 7⅝	$1397.00	$31.25
C126E	12x6x11⅞	1599.00	34.25
C108E	10x8x11⅞	1604.00	34.75
C128E	12x8x11⅞	1624.00	35.50
C148E	14x8x11⅞	1710.00	36.75
Style "E" Continuous Steel Buckets On Belt			
B85E	8x5x 7⅝	$1727.50	$34.50
B116E	11x6x 8⅝	1839.50	38.75
B128E	12x8x11⅞	2013.00	43.50

A complete line of parts and accessories available to build your own Bucket Elevators. Continuous Steel, Salem Steel and Malleable Iron Buckets available in a wide variety of sizes, shapes, gauges and styles at low prices. WRITE FOR BULLETIN #1203 AND PRICES DESCRIBING COMPLETE LINE OF BUCKET ELEVATORS AND BUCKETS.

NEW CONVEYOR BELTING SAVE UP TO 34%

WE PAY FREIGHT ON 200 POUNDS OR OVER



QUALITY TESTED CONVEYOR BELTING*

Major Brand: 12# to 15# Average Friction Pull. 800# to 1000# Average Cover Tensile.

Heavy Duty 4-ply, 28-oz. duck, ⅛" top rubber cover x 1/16" bottom rubber cover belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stocks.

Width	Ply	List Price	Sale Price
14"	4	$3.63 ft.	$2.83 ft.
16"	4	4.08 ft.	2.97 ft.
18"	4	4.51 ft.	3.29 ft.
20"	4	4.97 ft.	3.80 ft.
24"	4	5.85 ft.	4.26 ft.
30"	4	7.18 ft.	5.21 ft.
36"	4	8.51 ft.	6.18 ft.

Major Bee Brand: 16# to 19# Average Friction Pull, 2400# to 3000# Average Cover Tensile. Skim coat between plies.

A high grade of heavy duty 4 and 5-ply, 28 oz. duck, ⅛" top rubber cover x 1/16" bottom rubber cover. These belts are for more severe service, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal, and other similar materials, both wet and dry. Belts have molded rubber edges.

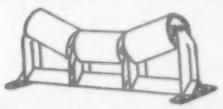
Width	Ply	List Price	Sale Price
14"	4	$ 4.31 ft.	$3.06 ft.
16"	4	4.85 ft.	3.46 ft.
18"	4	5.39 ft.	3.83 ft.
20"	4	5.90 ft.	4.37 ft.
24"	4	6.94 ft.	4.94 ft.
30"	4	8.53 ft.	6.07 ft.
36"	4	10.09 ft.	7.35 ft.
24"	5	8.14 ft.	5.78 ft.

***All belting is tested by the Engineering laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.**

Other widths, plies, duck weights and cover thickness available at low prices.

WRITE FOR FREE SAMPLE & BULL. #1234

BONDED® IDLERS AND RETURN ROLLS SAVE 25% AND MORE



3-roll, 5" diameter Troughing Idlers for:			
14" belt	$19.75	24" belt	$22.75
16" belt	20.50	30" belt	23.85
18" belt	21.90	36" belt	24.90
20" belt	22.10	48" belt	27.50
1-roll, 5" diameter Return Rolls for:			
14" belt	$ 8.50	24" belt	$11.00
16" belt	9.00	30" belt	12.50
18" belt	9.50	36" belt	13.75
20" belt	10.00	48" belt	16.50

All steel. Interchangeable with other well-known makes. Furnished with replaceable prelubricated sealed ball bearings. Maintenance is negligible. WRITE FOR BULLETIN #1138.

BONDED SCALE AND MACHINE COMPANY

PHONE Days: Hickory 4-2186 — **WRITE FOR FREE CATALOG AND PRICES** — PHONE Evenings: AX. 1-2213, HU. 6-3156

128 Bellevue — **Mfrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers and Feeders** — COLUMBUS 7, OHIO

QUARRY EQUIPMENT

Cedarapids Jr. Tandem Crushing Plant, 1036 Jaw.
Cedarapids 1236 Twin Jaw Crusher.
Cedarapids 6C, 1236 Twin Jaw Portable Secondary.
Cedarapids 1216 Twin Jaw Crusher.
Cedarapids Model 1 Kubit Impact Breaker.
Cedarapids 2033 Hammermill. Slightly Used.
Telsmith 36" Gyrasphere Crusher.
Williams No. 40 slugger type pulveriser
36" x 8'4" apron feeder with drive.
2—Cedarapids 4'x14' 3-deck screens. New warranty.
Cedarapids 4'x12' 3-deck screen. New warranty.
Pioneer 4'x8' Double Deck Screen. Rebuilt.
Robins 4' x 9' triple deck screen.
Cedarapids 30-S, 3-compartment Charging Hopper, Apron Feeder, Bucket Elevator. New.
27½ ton, single-compartment 8' x 12' bin.
1—Eagle 36" x 20' Double Log Washers.
60-ton, two-compartment, 8' x 16' storage bin with clam gates.
100-ton, two compartment, 13' x 23' bin
Special bins to your specifications.
Conveyors—18"—24"—30"—36". Also conveyor belting.

SHOVELS AND CRANES

P & H 855B-LC, 2-yd. diesel dragline.
P & H 655B 1½ yd. diesel dragline reconditioned.
Lorain L-26, ¾-yd. Diesel Dragline. Excellent.
Lorain L-25K, ¾-yd. Gas Crane.
Lorain TL-25, ¾-yd. Diesel Basic Machine.
Koering 304, ¾-yd. Diesel Shovel-Backhoe.
P & H 255A, ¾-yd. Diesel Clam-Crane.
Lima 34 Paymaster ¾-yard diesel shovel. Good
Unit 1020 ⅝-yard diesel powered shovel
Unit 614, ½-yd. Diesel Backhoe.
American 100, ½-yd. Gas Clam-Backhoe.
Lorain TL-20, ½-yd. Diesel Backhoe.
Bucyrus-Erie 10B, ⅜-yd. Gas Shovel-Backhoe.
Lorain MC-414 20-ton Moto-Crane reconditioned.
Link Belt HC-90 25-ton truck crane
Michigan TLDT-20, 20-ton Truck Crane
Lorain MC-4 15-ton Moto-Crane.
Lorain MC-110, 10-ton Gas Moto-Crane.
Lorain SP-107, 7-ton self-propelled crane

TRACTORS, TRUCKS, SCRAPERS, ETC.

1—Euclid TS-18, 18-yd. twin engine scraper.
3—Euclid 12-yd. overhung engine scrapers.
1—Euclid 7-yd. overhung engine scraper.
1—Euclid 15½-yd. six wheel scraper.
2—Euclid 13-yd. bottom dumps. Good.
2—Euclid 46TD, 22-ton Rear Dumps.
2—Euclid 20FD, 11-ton rear dumps
1—Euclid 16FD, 15-ton Rear Dump.
1—Euclid TC-12, Twin Engine Tractor.
1—Mack LRS 15-ton rear dump. Rebuilt
2—Allis Chalmers TS-340, 15-yd. overhung engine scrapers.
1—International TD 18 with cable bulldozer
1—Caterpillar D-8 with push block
1—Caterpillar D-7 with bulldozer, crane boom.
1—Cat. D-7 with Hydraulic Angledozer Blade.
1—Caterpillar D-4 Tractor only
1—Internat'l. 300 tractor, with loader backhoe.
1—Allis-Chalmers HD-19 with cable bulldozer
1—Caterpillar 12 diesel grader
1—Letourneau super C Tournadozer. Excellent.

SHOVEL ATTACHMENTS

Lorain 82 or 820, 2-yd. 33' boom, 20' stick
Osgood 903, 2-yd., 34' boom, 20'6" stick.
Lorain 36, ¾-yd., 19' boom, 16' stick

BACKHOE ATTACHMENTS

Lorain 56, 23' boom, 7' stick, 48" bucket.
Lorain 72, 25' boom, 9' stick, 54" bucket.

DIESEL POWER UNITS

Cat. D7700, 74 H.P. at 1000 RPM. Rebuilt
Cat. D13000, 138 H.P. at 1000 RPM. Rebuilt.
GM 3021C, 3-cylinder. new.
GM 671, 6-cylinder, rebuilt.
GM Twin Diesel, rebuilt.

GENERATOR SETS

Universal 5KW, 1200 RPM, D.C., 230-250 Volts.
Century-Waukesha 15 KW, 1300 RPM, 3/60/127-220.
Century-Continental 18KW, 1200 RPM, 3/60/120-208.
Cummins 25KW, 1200 RPM, 3/60/120-208.
Caterpillar 40KW, 1200 RPM, 3/60/220-440

AIR COMPRESSORS

105 cu. ft. LeRoi tractair with doner, backhoe.
2—105 cu. ft. Ingersoll Rand Gas Portable.
2—125 cu. ft. Gardner-Denver Gas Portables.
125 cu. ft. Jaeger gas portable.
160 cu. ft. Worthington Gas Portable.
210 cu. ft. Gardner-Denver Diesel Portable.
315 cu. ft. Schramm gas portable.
600 cu. ft. Ingersoll-Rand. Waukesha power
2—600 cu. ft. Gardner-Denver diesel portables.

L. B. SMITH, INC.
Camp Hill, Pa.
Phone Harrisburg REgent 7-3431

LARGEST SELECTION

ROTARY KILNS—DRYERS—COOLERS

1—Traylor 11' x 155' Rotary Kiln, 7/8" shell.
1—Allis Chalmers 9' x 130' Rotary Kiln, ¾" shell.
4—Vulcan 8' x 125' Rotary Kiln, 5/8" shell.
1—Vulcan 8' x 87', ½" shell.
3—Louisville 8' x 50', 3/8" steel shell with 1/4" stainless steel lining.
2—Vulcan 7' x 80', ½" shell.
2—Vulcan 7' x 55', 3/8" shell.
2—Link Belt Roto Louvre Dryers, 6'4" x 24'
1—Rennenberg 6' x 50', 3/8" shell.
1—Rennenberg 5'6" x 50', 3/8" shell.
1—Ruggles Cole 5' x 30', class A-8, Indirect Heat Dryer, 3/8" shell.
1—Allis Chalmers 4' x 40'.
1—Allis Chalmers 4' x 30', 3/4" shell.
2—Ruggles Cole 4' x 20', 3/8" shell.
1—Link Belt Roto Louvre Dryer, 3'10" x 20'.
1—34" x 30', 1/4" shell.
1—Traylor 30" x 18', 1/4" shell, 430 S.S.

MILLS—CRUSHERS—PULVERIZERS

2—Traylor Compeb Mill 7' x 27' with 1—500 HP & 1—600 HP motor 3/60/440.
1—Williams Hammermill, 300 HP.
1—Allis Chalmers 6' x 22' Tube Mill, 250 HP.
1—Smidth 6' x 20' Tube Mill, 300 HP.
1—Smidth 5'6" x 21' Tube Mill.
1—Hardinge 4½' x 24" Steel Conical Mill.
1—Denver 3' x 5' Continuous Ball Mill
1—Telsmith Reduction Crusher No. 46, 50 HP.
3—Kennedy 54" x 24" Two Roll Crushers.
2—Kennedy #6 Gyratory Crushers, 50 HP.
5—Jaw Crushers 12" x 18" to 36" x 48".
1—Penn. Non-Clog Swing Hammermill, size 5060, 47" x 60", cap. 200—275 tons per hour, requires 400 HP motor UNUSED.
1—Penn. Super-Thor Hammermill, size SXT13, 250 HP.
5—Raymond Bowl Mills, Two Roll, 60 HP.
3—Bradley 6' Hercules Mills, 300 HP.
3—Raymond 5 Roll Low Side Mills.

AIR SEPARATORS—SCREENS

1—18' dia. Raymond Double Whizzer Separator with 100 HP motor.
1—14' dia. Raymond Double Whizzer Separator with 60 HP motor.
1—Gayco 8' dia. mechanical Air Separator.
1—Raymond 30" dia. Whizzer Separator.
1—Dracco Dust Collecting System type DAAA-3 with Dracco Perfecto Filter #19 Clarage exhaust fan 2000 cfm, 10 HP motor.
1—Tyler Hummer Screen 4' x 10' type 38 with V-52 Vibrators and Thermionic unit.

ELEVATORS—CONVEYORS

14—Link Belt chain Elevators 22' to 60' high.
1—24" Troughing Belt Conveyor 75', 7½ HP.
1—Robins 84" x 22' Feeder Conveyor, 15 HP.
1—Robins 24" x 14' Belt Conveyor, 3 HP.
1—Robins 18" x 30' Troughing Conveyor.
1—Fuller-Kinyon Conveying System type H257, 100 HP.
2—Fuller-Kinyon Conveying Systems type 10B-No. R, 75 HP.

For inquiries on Boilers, Diesel Generator Sets, Turbo Generator Sets, Steam Engines, write to our Department P-1.

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MOTORS AND GENERATORS
All sizes, new and rebuilt. Starters, accessories, pulleys and repair parts. Gear motors, Falk Shaft mounted Speed Reducers, couplings and V-belt drives.
EXPERT REPAIR SERVICE
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SPECIALS

2 Model 56-S two yard Koehring tilting mixers
C-R 55x30 double roll crushers; 200 HP elec. Elec.
Symons 5½' cone crusher with 200 HP elec. motor
Traylor 56" x 72" sectional jaw crusher
Truss belt conveyors complete various lengths 24"-30"-40"-48"

CONCRETE MIXERS

2 Jaeger MDL. 168A. Port. Rubber tired.
Ransome Model 84S, 2 yd. tilting type
Smith 422, 4 yd. tilting type
Koehring 56S 2 yd non tilting type

TRUCKS—TRANSIT MIXERS

15 Ford F8-6 yd. end dump. Excel. Reinforced, 1955
10 Mack LRSW 32 ton rear dump trucks Cummins
8 Euclid 36 TD end dumps 300 HP Cummins Diesel
10 Euclid 28 FD rear dumps 15 ton cap. Cummins
13 Euclids rear dump 12 FD 15 ton; 7 Euclid bottom dump 43 BDT 18 ton
4 Jaeger Transit Mixers 5½ yd. Hi-Dis. New 1957
3 Jaeger 5½ yd. Hi-Dis. Autocar.
2 International RF 192 Transit Mixers high dump six yards Westinghouse. New 1957.

CRUSHERS—KILNS—DRYERS

JAW: Acme 10x20, 15x24, 14x36, 14x38, 10x43, 16x32, 18x32, 25x40. Eagle 10x16, 20x36. Diamond 24x36". Cedar Rapids 10x20, 15x36, 20x36, 25x40. Farrell 10x20, 18x30, 14x36, 18x36, 36x48. Buchanan Type C 30x42, 36x42. Traylor 18x36, 24x36. Allis-Chalmers 36x18. Good Roads 10x30. Telsmith 18x32. Universal 18x34.
GYRATORY: Al-Chal 6, 7½, 8, 9, 10, 12, 16, 18, 20". Telsmith TY 4', 3' Gyrosphere
25B Kennedy Van Saun 12, 37½, 36, 49½"
ROLL: Cedar Rapids 40x20, Pioneer 40x22, 30x18, 54x24 triple roll; Telsmith 24x16. Universal 13x18
HAMMERMILL: Jeffrey Type BS 24x20, Type B 36x24, 26x36, 36x42, Eagle 24x24, Stedman 34x30, 36", 42". Cedar-Rapids 50-50, 30x33, 30x42.
BALL MILL: Hardinge conical 10'x48", 8'x48", 8'x36", complete, motors, Traylor 7'x25'.
TUBE MILLS: Smidth 6'6"x21', 5½x20'.
ROD MILL: Marcy 3'x8' center discharge, 3'x8', Jackson & Church 4'x10'
AUTOCLAVES: J&C 6'6"x58' Quick Acting; 6'x30'
CONE: Symons 3', 4½' standard head coarse bowl
KILNS: 4'x42', 5'x36', 6'x50'6", 6'4"x45', 11'x155' Vulcan 9x100, 10'6"x105', 9'x124', 6'x36', 6'x72'.
DRYERS: 6'x20', 8'x72', 5'x24', 4'6"x32', 3'6"x28', 6'x30', 5'x35', 6'x24', 6'x40'.
COMPEB MILLS: A-C 7'x24', Patterson 7x18.
FEEDERS: Synstron F55 48x72", 48x60", Jeffrey 36x72". Telsmith 36"x14', Universal 36"x32'.

CRUSHING—WASHING—CLASSIFIER

Pioneer 56 Port. Crushing Plant, 10'x18" Model UD-2641H Diesel engine, New 1955.
Pioneer Port. 10x24 Jaw 24x16 roll compl. Diesel
C-R 2540 Prim. Port. Diesel
Pioneer Special 34, 10x24 Jaw 24x16 Roll. Diesel.
C-R Primary Port. 22x36 Jaw. Diesel.
Eagle 36x22' single screwspiral etc.
Lippman Port. WASHMORE washing plant, 36"x 18" sand classifier, 48"x12" revolv. scrubber etc.
Diamond Wes-Con port. Primary 20"x36" crusher
C-R Port. Prim. 20x36" Diesel R. B.
Eagle BMC Log Washer 48"x30' GM Diesel
Eagle 24"x25' dbl. screw washer 15 HP motor

CONCRETE PLANTS AND EQUIPMENT

Noble CA 354, 4 compts. Complete Large cap. 350
Johnson 2 agg. bins 50 tons ea.-cement silo 1500 bbls.
Erie-Strayer 120 ton aggr. bin 880 bbl silo ground storage 1300 bbl silo
B-K P3100 3 compt. aggr. Heltzel 450 bbl cement
Erie-Strayer P3 3 compt. 195 tons aggr. bin; cement silo 675 bbls. cement interlocking
Erie Strayer port. New 1955, 40 yds. per hr. 600 bbl. cement silo
Johnson 400 yd 5 aggr. 1500 bbls. cement batch 5000 bbl. silo 3-2 yd mixers
Johnson automatic batch 10,000 bbls. cement storage 3-2 yd mixers; screening equipment.
Johnson TY 226 2 compt. agg. w/TY1320 cement unit
Erie—Strayer 2, 50 T. compts. 300 bbls. cement 750 bbl. silo.
Johnson TY-227 70 cu. yd. 105 ton 3 compt. aggr. bin TY168 batcher.
Blaw-Knox BCPC 600 bbl cement silo
Blaw-Knox BCPC 300 bbl cement bin
B-K 3 Comp. 200 yd. ag. bin, cement silo 3000 bbls., 2 Koehring 56-S mixers.

SUCTION DREDGES FOR SAND-GRAVEL

Morris 6" Diesel on 14'x36' hull
Ga. Iron Works 8" suc. 6" disc. Diesel New 1957.
10" Portable Diesel powered. Complete.
Amsco 12" suc. 10" Dis. Hull 24'x50' Diesel-Elec.
Elliott 8" with cutter. Diesel Hull 48'x18'x3'6"
8" Hydraulic Diesel. On 32'x8' steel pontoons
6" portable Diesel complete with cutters, etc.

SCREENS

Tyler-Hummer 4'x10' 2 Deck
New Symons 3'x12' 5 HP. Elec. Motor.
Pioneer 5'x12' 3 deck spring suspension
Cedar Rapids 4'x12' dbl. deck 25 H.P. eloc. motor
Pioneer 5'x12' 2 deck 20 HP elec. motor
C-R 4'x14' 2 deck 25 HP motor

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1—13" x 30" Type B Farrel Bacon Jaw Crusher
1—24" x 14" Allis-Chalmers Crushing Rolls
1—Hardinge Conical Ball Mill 8' x 22"
1—3' x 8' Hardinge Rod Mill & spare liners
1—Syntron Feeder F-44
2—Link-Belt NP-135 Vibrating Screens
1—Link-Belt Mine Hoist 42" x 48" Drum, Herringbone Speed Reducer D16-18-20
1—36" x 20' Revolving Screen
1—36" x 11' Revolving Screen with Scrubber
1—30" x 14' Revolving Screen
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CEDARAPIDS 2540 Jaw Portable w/feeder, conveyor, Cat. diesel, vibr. grizzly, tandem rubber. #15864. $32,500

UNIVERSAL 293QH4 Senior Portable Plant w 2036 Jaw, 3x8 feeder, 4x12 3-deck screen, rotovator, 30" conveyors, 26x36 hammermill, two Cat. D337P diesel power units, tandem rubber, late model, like new. Save over 30%. $48,500 Terms.

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ROGERS SCREENING & Crushing Plant, portable, w/4x10 2-deck vibrating screen, rotovator, 3023 Hammermill, Cat. D13000, plant & delivery conveyors, mounted tandem rubber. $8500

PIONEER Type 16T49 Portable Gravel Plant, w/1016 rb. Jaw, 1616 rb. rolls, 3x8 2 deck vibr. screen, portable field conveyor w/feeder, two delivery conveyors, UD14 diesel, pneumatic tires. $7000

JAW DIES for **PIONEER** 3042, brand new gov't surplus, stationary, $400 each. Yard.

LINK BELT LS85 Shovel, ¾ cy. #7A1324, new 1951, Cat. D318 diesel. $6850 Yard.

OSGOOD 810 Shovel 1½ cy, air controls, 671 GM diesel, excellent. Dragline attachment available $16,500 Rent $1250/mo. apply purchase.

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EAGLE Twin Screw Fine Material Washer, 20"x30" screws, motor, excellent. $3000 Yard.

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CONVEYORS, Cedarapids 30"x40' complete, less motor. New, $1950.

COMPRESSORS, Ingersol 600 cfm Rotary, portables, $7000. Ingersol 315 cfm Portable, Diesel, UD18 engine, rebuilt, $2850. Davey 210 cfm portable diesel, rebuilt, late model. $2000. Rent $200-500 per month, apply purchase.

DRILLS, Worthington UM40 Wagon Drills, brand new, ⅓ price, $1500. Worthington #55 Jackhammers, brand new, less ⅓ price. $300

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4—Allis-Chalmers 5' x 22' ball-tube mills, 150 HP motors. VERY LOW PRICE.

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GYRATORY, Kennedy, 49, 12½", 100 HP
JAW, 36" x 15", 20" x 6" 18" x 9"
BABCOCK & WILCOX Type E3Z, 75 HP
RAYMOND, 6 Roll, Low Side, 200 HP
HAMMERMILLS, PENNS. C3-30, 60 HP
HAMMERMILL, PENNA. NON-CLOG #5060, Series #DNC, 400 HP, non-clog, 1952—UNUSED.
ROBINSON 36" Saw-tooth, 15 HP

DRYERS & KILNS

11' x 155' Traylor Kiln, ¾", Shell.
9' x 100' Kiln, Vulcan, ⅝" shell.
8' x 115' Kiln—½" shell, 2 tires.
7'6" x 100' Kiln, ½" shell
7'6" x 60' Kiln, ½" welded shell
6' x 60' Kiln, ⅜" shell
8' dia. x 70' L, Ruggles Coles, Double. Shell,
7' x 50' Allis-Chalmers dryer, ½" shell
6' x 50', Louisville dryer
5'6" x 50', Renneburg, Dryer, ⅜" shell
4'8" x 33', ⅜" Shell. Dryer
4' x 24' L, brick lined kiln.

MILLS

BALL, TRAYLOR 8' x 11', 300 HP
CONICAL BALL, Hardinge 4'6" x 16", 25 HP
COMPEB, Allis Ch., 7' x 24', 450 HP
BALL-TUBE, Allis 5' x 22', 150 HP
ROD, Kennedy 4' x 8', 50 HP, EPD
BALL, Allis 6' x 15', 150 HP
BALL, Marcy No. 64½, 125 HP
ROD, Marcy 7' x 15', 300 HP (4" liners)

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Insley "K-12" ½ yd. Trench Hoe.
Insley "K-12" ½ yd. Dragline Machine.
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Bantam "T-35" ⅜ yd. Hoe, mounted Bantam Carrier.
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P&H NEW Shovel Attachment for Model 255A complete, Discounted. "TL-20".
Lorain USED Shovel Attachment for Model

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3—Jaeger & Smith 5 yd. Mixers.
2—Jaeger & Smith 4½ yd. Mixers.
2—Jaeger & Rex 3 yd. Mixers.
Offered Mounted or Un-Mounted.

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Peerless 24x70' NEW Portable Conveyor, gas or electric power, Swivel Wheels.
Seco Used 4 x 14'0" 2-Deck Screen.
Gruendler "2XB" USED Pulverizer.

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ELEVATOR—90' open inclined with 15" x 14" buckets on 2 strands of chain
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80 Ton GE Diesel Elec. Loco. New 1950
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2'x30'x⅜" Rotary Cooler
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6'x50' Louisville Dryer
6'x60'x½" Vulcan Kilns
7'x50' Ruggles Cole Dryer
8'x60'x½" Rotary Kiln
8'8"x70'x½" Direct, Indirect Dryers
8'x115'x⅜" United Kiln
8'x125'x⅜" Beth F'dry Kilns
9'x100'x⅜" Vulcan Kiln

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15"x8" to 24"x18" Jeffrey Hammermills
C3-30 Pennsylvania Hammermill
30"x14" Allis-Chalmers Roll Crusher
Size R322 Allis-Chalmers Crusher
42"x40" Superior McCully Jaw Crusher
20"x6" Bacon Type "B" Jaw Crushers
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7'x24' Compeb Mills 3 Compartments
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1 Lima Dragline Model 1291, 80 ft. Boom, 3½ yd. dragline bucket, LR Cummins diesel power just factory rebuilt. Available July 15. Good condition. Price $49,500.

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1 Northwest Crane Model 105 serial 2405 with 1¼ yd. dragline bucket, 40 ft. Boom, and equipped with GMC Diesel 471 engine. Fair condition. $3000.

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1 1951 Rex Adjusti-Hite Mixer 6 yd. Good condition. $1300.

1 1951 Blaw Knox High Discharge 3½ yd. Good condition. $1200.00.

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3 1948 Smith High Discharge 3½ yd. Good condition. Each $500.

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2—20 H.P., Gas and Diesel.
2—25 H.P., Gas and Diesel.
1—600 H.P. and one 1000 H.P. General Motors (EMD) Diesel Electric Switchers.

CAR DUMPERS: Link Belt, standard railroad gauge, rotary type, 62 ft. transfer table. Also, one for 42" and 36" gauge mine cars.

BATCHING PLANT: One complete batching plant including 5 cu. yd. aggregate batcher, 4 compartment bin with cement bin and 600 bbl. ground storage silo, bucket elevator, air compressor, etc., with or without 50 TPH under track screw for unloading cement.

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CLASSIFIERS: One Akins and one Wemco 78" x 36 ft., duplex spiral, with motors and drive, condition like new.

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Link Belt DEWATERING ROTOSCOPE 12' dia.
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ASPHALT PLANTS model 840, 842 & 848.
HYDRATED LIME PLANT 50 tons per day.
2', 3', 4' SYMONS. 3036 Dixie hammermill.
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1 Northwest 80-D Shovel, also dragline attachments & buckets
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1 Telsmith 13-B Crusher
1 Telsmith Coarse Material Screw Washer
1 48" Telsmith Super Scrubber
1 Syntron Grizzley Feeder F-86
1 10" Peerless Turbine Pump 150 HP—2000 GPM

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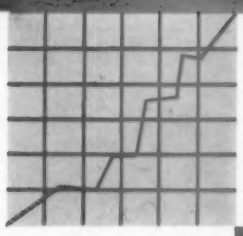

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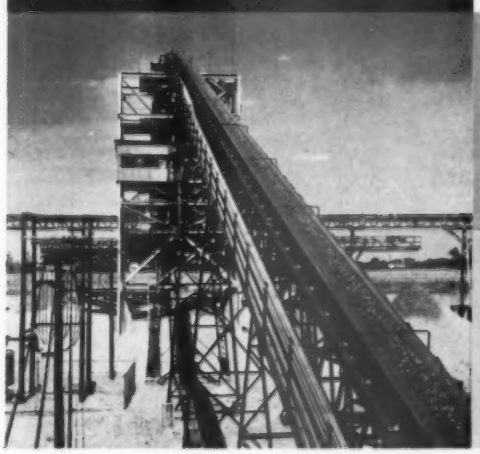

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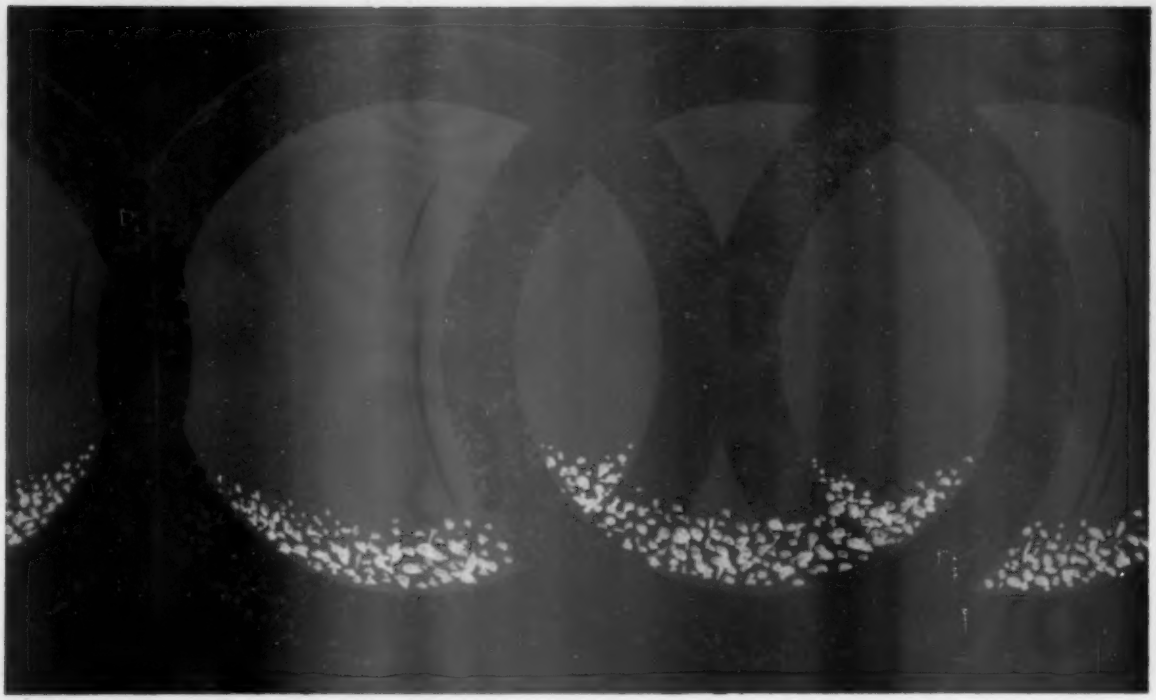

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